Seminar für Ländliche Entwicklung Berlin
SLE SCHRIFTENREIHE - S268

Quality falls from Kyrgyz trees! Do consumers know?

Research on supporting food safety compliance to facilitate market access for Kyrgyz SMEs and economic opportunities for Jalal-Abad / Kyrgyzstan

Thomas Pfeiffer, Daniel Baumert, Erik Dolch,
Artem Kichigin, Elnura Kochkunova

2016

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Seminar für Ländliche Entwicklung | Centre for Rural Development

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SLE Postgraduate Studies on International Cooperation for Sustainable Development

SLE PUBLICATION SERIES S268

Study commissioned by
Deutsche Gesellschaft für Internationale Zusammenarbeit

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Berlin, October 2016

Supported by

Federal Ministry for Economic Cooperation and Development

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

be Berlin
Senatsverwaltung für Wirtschaft, Technologie und Forschung

SLE PUBLICATION SERIES S268

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Print
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Planckstr. 11
16537 Grünheide
Germany

Distribution
SLE
Hessische Str. 1-2
10115 Berlin
Germany

Cover photos
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1st edition 2016 (1-150)

ISSN 1433-4585

ISBN 3-936602-79-4

Acknowledgements

The team would like to thank the republic, regional and local authorities of Kyrgyzstan, the SLE, the interview partners, as well as GIZ's partner organizations and especially the donor. Therefore and with this acknowledgement, we would like to thank GIZ Kyrgyzstan. In the weeks of joint work, GIZ allowed the SLE team insights in interesting details during fruitful interviews, discussions and talks. The GIZ country team, GIZ's NAWI project, the GIZ field offices in rural Kirgizstan and particularly Jalal Abad performed impressively and made this research / consultancy possible. In order to spread this report to a maximum extend, the English language was chosen. In order to achieve the highest relevance, the SLE team consciously worked with a mixed team Kyrgyz / German.

The SLE team hopes that this report is found helpful by GIZ and its partners such as Lesik-Yug, UNIQUE forestry and land use GmbH, AGROLEAD and all the relevant stakeholders, so that they can use it in their important work for Kyrgyzstan's future.

The SLE Kyrgyzstan team

Table of contents

List of tables

List of images

Abbreviations

ADB	Asian Development Bank
AFVE	Association for Fruit and Vegetables Enterpreneurs
BMZ	Federal German Ministry for Economic Cooperation and Development
BRC	Global Standard for Food Safety by the "British Retail Consortium"
CBF	Dutch Center for the Promotion of Imports from developing countries
CCI	Chamber of Commerce and Industry
CSM	Kyrgyz Center for Standardization and Metrology
EAEU	Eurasian Economic Union (Armenia, Belarus, Kazakhstan, Kyrgyzstan and Russia)
EDP	Export Development Plan
EU	European Union
FAO	Food and Agricultural Organization of the United Nations
FBO	Farmer Based Organization
FDI	Foreign Direct Investment
FSMS	Food Safety Management System
GAP	Good Agricultural Practice
GDP	Gross Domestic Product
GFSI	Global Food Safety Initiative
GIZ	Deutsche Gesellschaft für internationale Zusammenarbeit
HACCP	Hazard Analysis and Critical Control Points
HPLC	High Performance Liquid Chromatography
IFS	Global Standard for Food Safety by "International Featured Standards"
IMF	International Monetary Fund
IPD	Import Promotion Desk
ISO	International Organization for Standardization
ITC	International Trade Center
JIA	Association for Young Entrepeneurs
KCA	Kyrgyz Center for Accreditation
KGS	Kyrgystani Som
KyrgyzSt	The National Institute for Standards and Metrology in Kyrgyzstan
LLC	Limited Liability Company
MoE	Ministry of Economy
MoH	Ministry of Health
MoA	Ministry of Agriculture
MRL	Maximum Residue Levels
NSC	Kyrgyz National Statistical Committee
NQI	National Quality Infrastructure
SME	Small and medium enterprises
PFS	Private food safety and quality standards
PTB	National Metrology Institute of Germany
QI	Quality Infrastructure
QISP	Quality Infrastructure Service Provider
QMS	Quality Management System
RAS	Rural Advisory Service
SLE	Seminar für ländliche Entwicklung
SQF	Global Standard for Food Safety by the "Safe Quality Food Institute"
ToR	Terms of Reference
VC	Value Chain
WTO	World Trade Organization

1 Introduction

Kyrgyzstan, a landlocked country in Central Asia, is among the top reformers of the region. Pro-market reforms, a parliamentary political system and an open trade regime have fuelled hopes for a positive development trajectory. However, Kyrgyzstan remains one of the poorer countries in the region with an immense informal economy. Major contributors to official GDP are mineral extraction and the fast growing service industry. Both sectors generate neither significant spill over effects nor much value-adding. As a consequence, employment opportunities are scarce, people in rural areas rely on agriculture and a high degree of the young population migrates to bordering countries.

In 2015, about 28 percent of Kyrgyzstan's total labor force worked abroad mostly in Russia (77,7 percent) and Germany (11 percent) (World Bank, 2015). A large part of their wages are sent home contributing significantly to household income. However, migration constitutes a brain drain, which affects Kyrgyzstan's future, which depends upon its educated young population. Therefore, economic opportunities and jobs are necessary as well as wages have to be remunerative. This becomes particularly important as population demographics show a majority of the population below 30 and a continuously high birth rate (UN World Population Prospects, 2016).

While agriculture remains an important employer, the manufacturing industry and service sector offer the greatest potential to attract the young population to stay in Kyrgyzstan. Here, small and medium enterprises are extremely important. Supportive measures to facilitate innovation, process upgrading and growth can tap into comparative advantages and help to create attractive jobs for the young population.

Next to the service sector, the agro-food industry is a very promising manufacturing sub-sector, which can rely on an abundance of fruits and vegetables as raw material, mostly in Kyrgyzstan's south. Amongst its neighbouring countries, these are considered to be of top quality. However, with the internationalization of food supply chains and new trade rules, food quality and increasingly safety have become an issue of sophisticated certification processes. Hence, Kyrgyzstan's accession to the Eurasian Economic Union (EAEU) should facilitate access to important markets in Eurasia, but the customs union poses a challenge for Kyrgyzstan's agro-food industry food safety and quality. Overcoming this challenge requires providing quality infrastructure services to Kyrgyzstan's small and medium enterprises in order to confirm compliance with the standards required by their customers.

2 Introduction

Occasion and objectives of the study

Since 2014, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) is implementing, on behalf of the Federal German Ministry for Economic Cooperation and Development (BMZ), its "Promotion of Sustainable Economic Development Programme" aiming at increasing income and employment opportunities, particularly for young people and women. One core activity is value chain development offering services and capacity development to Kyrgyzstan's small and medium enterprises. This year, GIZ signed a co-financing agreement with the Swiss Government, particularly targeting food safety and quality along selected value chains. For project implementation, the tomato, apple and plum value chains of Jalal-Abad Oblast were chosen.

This study was commissioned to "provide recommendations on how food safety and quality infrastructure services can be improved so that employment is created" (GIZ, 2015: 2). It is further expected to "provide a comprehensive context analysis for open up discussion with stakeholders on how to improve QI along selected value chains (…) [and on] how to design measures which increase the involvement of youth in supporting value chain promotion" (GIZ, 2015: 5). During the inception phase, a chain of effects was developed linking food safety improvements to employment creation. Generally speaking, improved food safety does not create jobs per se. While it prevents foodborne diseases, the additional costs can only be recuperated, if customers value food safety and are willing to pay a higher price. This paying for more quality not only includes the higher production costs, but also the additional costs to maintain the quality infrastructure QI. The corresponding customer segment, predominantly prevalent in developed countries, considers compliance with conventional food safety regulations as a minimum requirement. Hence, improved food safety can enable companies to access new, higher-value market segments. These currently untapped markets are a source of growth, which can lead to production growth and innovation in Kyrgyzstan, which in turn creates jobs. Not only at the company-level but also at up- and downstream parts of the value chain including the service industry.

Taking these objectives and combining them with the description of the technical cooperation measure outlined in the proposal for the Promotion of Sustainable Economic Development in Kyrgyzstan (Project no. 2013.2150.4), the SLE team identified two outcomes for this consultancy:

- Outcome 1: (micro- / meso-level)
  GIZ is utilizing results of this study to implement TC-measures facilitating the set up and maintenance of sustainable QI services as well as private quality management systems with the purpose to improve market access.

- Outcome 2: (macro-level)
  GIZ and its implementing partners are utilizing the results to enhance dialogue with and among NQI / other relevant stakeholders to improve national framework conditions and (youth) employment.

In order to achieve these outcomes, procedural compliance gaps along the preselected agro-food supply chains (Output 1) and conformity assessment gaps in Kyrgyzstan (Output 2) form the basis. They aim at identifying needs for facilitating the compliance of Kyrgyz' tomato, apple and plum value chains with food safety and quality standards set by important markets. Important markets are defined as those with a minimum set of required standards, thus requiring the use of quality infrastructure services. Hence, the study focuses on formalized markets rather than informal village markets and bazaars. Consequently, domestic supermarket distribution channels and international export markets (EAEU, EU) are the focus of the study. Therefore, compliance gaps and conformity assessment gaps are evaluated against the standards and regulations set by those markets, namely the EU *General Food Law,* the regulation (EC) No 1881/2006 on maximum levels for certain contaminants and the technical regulations of the EAEU customs union on food safety, labelling and packaging. A study of local compliance solutions (Output 3) complements those two outputs to identify entry points for compliance-enhancing measures. They will be utilized to come up with context-specific recommendations for action to improve the compliance with food safety and quality standards.

Thereby, the study follows the rationale that confirmed compliance with food quality and safety standards allows Kyrgyz SMEs to participate in international food supply chains easing access to profitable markets. This is assumed to create additional incomes for companies leading to new jobs and better income among beneficiaries, and particularly for youth.

Structure of the report

In order to deliver on this objective, the study focuses on current trading practices in the three selected value chains presented in chapter 4 and quality infrastructure services (chapter 5) and their capacity. This will be followed by case-study based comparative analysis. Here, similarities and differences between fully compliant cases and currently non-compliant cases are identified. Chapter 7 lists the recommendations how to support SMEs in the tomato, plum and apple value chain in order to improve their food safety and quality compliance. Based on a discussion of the findings, the study also developed recommendations on how to improve utilization of quality infrastructure services in the hope of promoting the overall business environment.

2 Context

Geographical context

Kyrgyzstan is a landlocked country in Central Asia that shares borders with Kazakhstan, Uzbekistan, Tajikistan and China. It is roughly the size of Hungary and Austria combined. Around 94 percent of its 200,000 km² are mountains up to 7000 meters height. FAO categorizes Kyrgyzstan's ecological zones in temperate desert, and mostly temperate mountains. Forested area amount to 1.182 Million Ha.

Its development trajectory has been largely shaped by its natural resources, the structural and institutional legacy of the Soviet era as well as the mentioned geographic location (Mogilevskii & Omorova, 2011).

Political context

In 1991, Kyrgyzstan gained its independence with the disintegration of the Soviet Union. Following, it embarked on a transition from an authoritarian, centrally planned to a democratic, free-market economy. Liberalization and privatization gave way to widespread corruption and nepotism soon reversing initial progressive reform steps (ADB, 2014: 8). Public dissatisfaction with neo-patrimonial rule and elite-capture led to the political upheavals in 2005 and 2010, each ousting the incumbent president of the time (Temirkulov, 2010).

In order to reestablish political order, an interim government initiated a constitutional process rearranging political powers creating Central Asia's first parliamentary republic in June 2010 (ADB, 2014: 8). The constitutional process was interrupted, however, by violent inter-ethnic clashes between ethnic Kyrgyz and ethnic Uzbek over issues of political rights and access to resources. The outburst was another episode in a complex inter-ethnic relationship rooted in arbitrary Soviet border demarcation.

Since then, Kyrgyzstan has witnessed numerous peaceful – but frequent – government changes hinting at its increased democratic maturity, but seriously harming political stability. Various surveys identified political and government instability as – by far – the most significant problems for investors and businesses undermining the country's economic development (IBC, 2014; World Economic Forum, 2009, 2011). More recently, survey participants stated corruption as the biggest hurdle to doing business and economic development (ADB, 2014: 67). In its National Programme for Sustainable Development, the government has declared both as focal points for future policies (EBRD, 2015: 7-9).

Socio-economic context

The breakdown of the Soviet Union caused severe disruptions to the socio-economic conditions in Kyrgyzstan. As supply-lines were disrupted, subsidies withdrawn and market access lost, Kyrgyzstan's manufacturing sector formerly integrated in the Soviet Union's division of labor collapsed. While all sectors were affected, industrial production suffered the most as it fell by almost 75 percent relative to the 1990 level (World Bank, 2015d). As it has yet to recover, it marked the beginning of deep changes to the sectoral structure of Kyrgyzstan's economy.

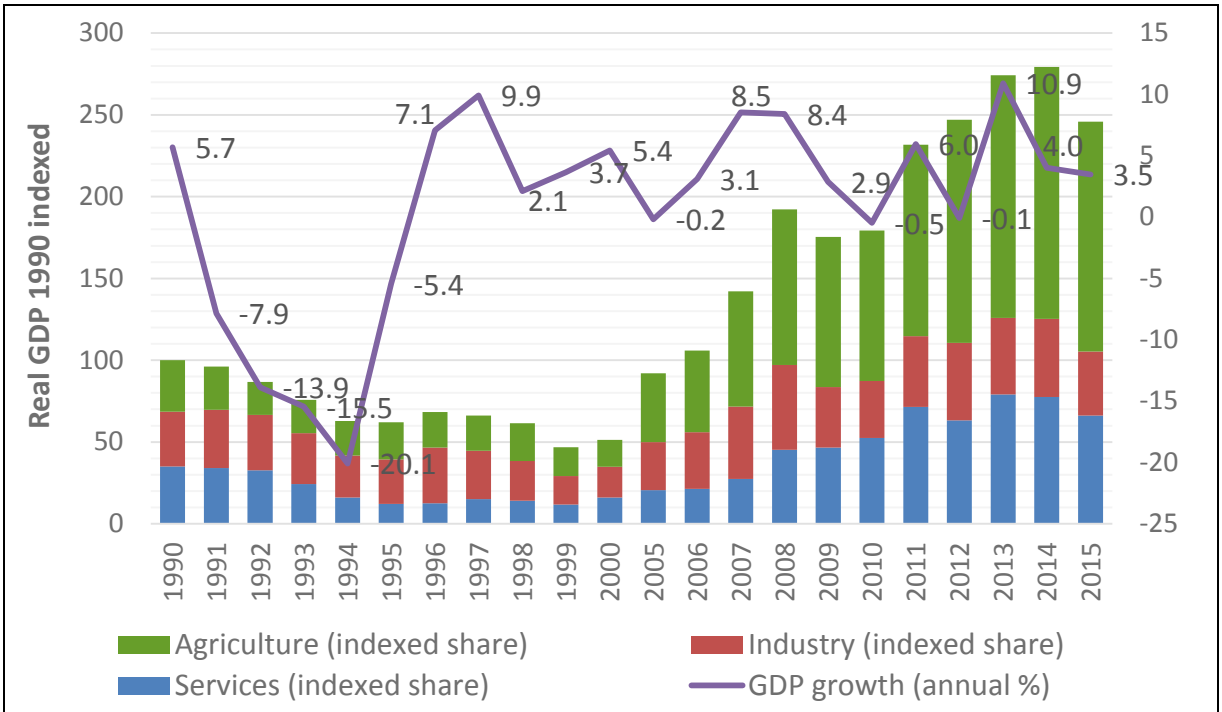

Image 1: GDP composition and growth rates (years 1990-2005)

Source: World Bank, 2015d

At the beginning of 1996, a reformed agricultural sector and gold production drove a GDP recovery. In more recent years, agricultural growth has been stagnant and the service sector has taken over as the country's largest sector (Figure). However, agriculture remains a key sector accounting for 16 percent of GDP in 2015 and employing roughly 30 percent of the workforce (World Bank, 2015d). Being responsible for the GDP growth, Gold production is generating around 45 percent of total export revenues, and remains important, but rather for Kyrgyzstan's trade balance than for domestic growth (ADB, 2014: 12; Mogilevskii, Abdrazakova, & Chalbasova, 2015).

The impressive growth in services has been driven by wholesale and retail trade as the countries geographic location and liberal trade regime turned it into an important regional hub for cross-border trade (ADB, 2013: 18; FAO, 2012: 7). Trade volumes grew tenfold over the past 15 years providing now one sixth of Kyrgyzstan's GDP (NSC, 2016). An important component of the trade sector is re-exporting goods from China, Turkey and other countries mainly to different parts in Russia and Kazakhstan (Mogilevskii & Omorova, 2011: 4).

Apart from trade, remittances have been an important driver of economic growth spurring private consumption (Mogilevskii, 2008). Although inflow growth has been slowing down (World Bank, 2015b), remittances are still the second largest source of foreign currency and represent a significant share of the income (approx. 50 percent) of about 15 percent of Kyrgyz households. Roughly 75 percent of all remittances are sent to the Southern regions, namely Batken, Osh, Jalal-Abad (Mogilevskii, 2008). In 2015, around 28 percent of Kyrgyzstan's total labor force worked abroad mostly in Russia (77.7 percent) and Germany (11 percent) (World Bank, 2015b). Kazakhstan has significantly lost its attractiveness for Kyrgyz migrant workers over the past ten years. Today, only 3 percent of all Kyrgyz emigrants live and work in Kazakhstan (Mogilevskii, 2008). Labor migration is driven by a lack of economic opportunities, employment and low wages. Labor migrants are predominantly from rural areas and the majority has secondary or higher education (Vinokurov, 2013). Estimates suggests that remittances reduce the national poverty rate by some 6-7 percentage points (Slay, 2015).

An ambivalent reality appears as follows: On the one hand, Kyrgyzstan's economy with its major indicator GDP is driven by the extractive industry. However, for the majority of Kyrgyzstan's population participating in the national economy small, family-run companies are dominant (ADB, 2013: 10; EBRD, 2015: 14). As the regulatory environment puts a lower burden on smaller entities, their numbers have been growing significantly over the last years (ADB, 2013: 25). The majority of them is concentrated in sectors such as trading with no or little value added (EBRD, 2015: 11). In total, small and medium enterprises (SME) contribute 39 percent to the total GDP, employ 19 percent of the working population and account for the majority of output in agriculture, trade and repairs as well as hotels and transportation (NSC). However, most of them operate in the large informal sector to avoid regulatory costs and being subject to rent-seeking (ADB, 2013: 27). Estimates suggest that the informal economy has a size of 25 percent-80 percent of GDP and employs almost 70 percent of the working population (ADB, 2013: 27, 2014: 18). Regulatory incentives for smaller entities coupled with informality hamper ability and willingness to innovate, improve competitiveness and grow (ADB, 2014: 11; EBRD, 2015: 11). Consequently,

Kyrgyz SMEs often possess inadequate skills and management practices. Furthermore, the apparent ambivalent situation of formal and informal labor markets constitutes a major challenge for this research, because it requires assuming a trickle-down effect of within the national economy.

Concluding, Kyrgyzstan's economy is very vulnerable and lacks a vibrant private sector striving for innovation and growth (ADB, 2013: 10, 2014: 18; EBRD, 2015: 11). This explains one the one hand its volatile growth performance and on the other hand its stable, relatively high poverty rates despite significant growth of the national economy.

While poverty steadily decreased until 2008, it increased following the political turmoil before dropping to its 2008 levels in 2015. A closer look at regional poverty rates reveals that almost 3/4 of the poor live in rural areas, mostly in the South (NSC, 2016).

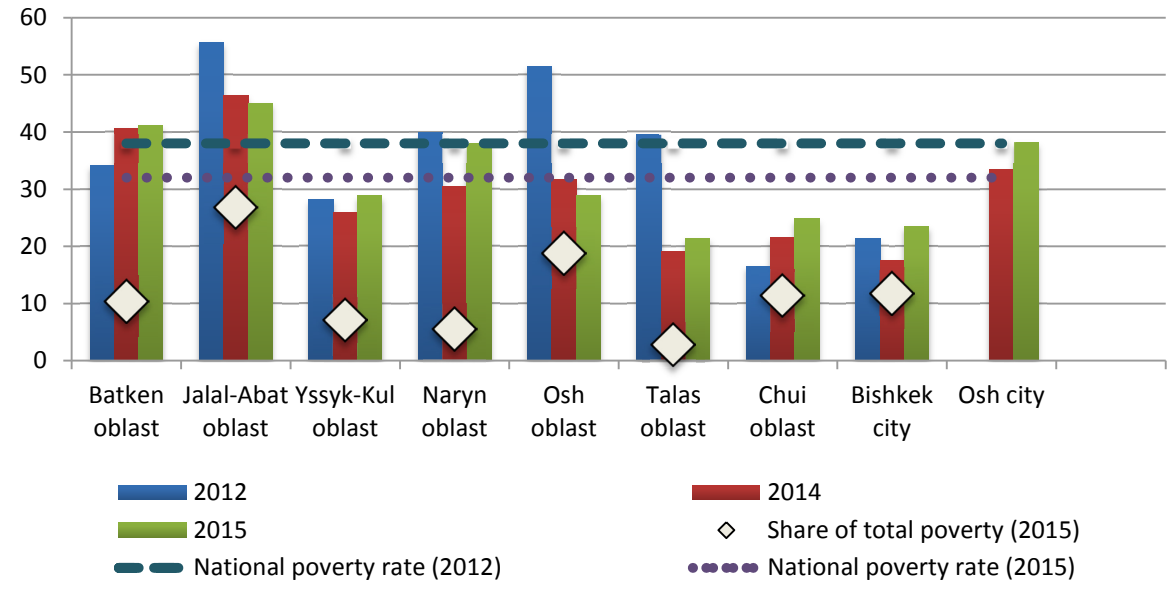

Image 2: National and regional poverty rates (2012-2015)

Source: NSC, 2016

This hints at significant regional rather than rural-urban disparities in Kyrgyzstan (Atamanov, 2013: 7). These structural differences origin in asymmetries left by the Soviet Union among regional economies such as Kyrgyzstan, Tajikistan and Uzbekistan. While the major cities are dominated by the service sector accounting for more than 80 percent of their gross regional product, the poorest regions are dominated by agriculture. The largest share of industry can be found in Issyk-Kul. Due to these

differing regional economic structures, Bishkek City and Chui offer the most attractive economic opportunities. Most other regions face a dismal lack thereof. This further increases rather than decreases income inequality over time (ADB, 2014: 85; IMF, 2016). Taking the GINI coefficient indicator, the economy appears inclusive (2012, Gini). Also the poverty headcount ratio at 3,10$ a day has improved from 75percent in 2000 to 24 percent in 2013. However, National economic growth in Kyrgyzstan has failed to benefit the poor as the lower parts of the income distribution have far below average real GDP growth rates (IMF, 2016). This linked to a non-diversified economy with lagging job creation (World Bank, 2015c).

Employment has been the most important factor reducing poverty in Kyrgyzstan over the past years but job creation has been lagging behind labor force growth (World Bank, 2015a: 6, 2015c: 17). Hence, formal unemployment remains high (9-10 percent), particularly among youth and women. More importantly, the many "jobs" are often unpaid and family jobs. The job gap is the largest for young rural males who only completed their secondary education (ADB, 2014: 88-92; EBRD, 2015: 12; World Bank, 2015c). This job challenge will grow in years to come due to population demographics. In Kyrgyzstan, the majority of the population is below 30 and birth rates remain high (UN World Population Prospects). Hence, job creation is key to Kyrgyzstan's development prospects.

Given the economy's current structure, and given the GINI as well as Poverty headcount ratio indicators the assumption is made here that employment generation will most likely come through the entry and expansion of new, initially small firms. Employment should further improve with a diversification into higher-value-added products and expanding into new markets. Such export-led growth would also help to decrease Kyrgyzstan's dependency on remittances (ADB, 2013; World Bank, 2015a: 6, 2015c: 19).

Agro-food industry

The agro-food industry offers such potential for diversification, value-adding and export-led growth. It currently employs 36 percent of total working population, represents 23,5 percent of GDP and 10-15 percent of total export value (FAO, 2012). Agricultural production is focused on dairy products, meat, vegetables and fruits all of which represent growing international markets (FAO 2016, ITC 2016). Kyrgyzstan's current food processing industry creates its biggest turnover with dairy products, flour and sugar. However, most processing companies rely on old machinery and have poor or unattractive packaging and labeling. They compete rather on price than on quality and their management rarely possesses sufficient marketing skills (Swinnen, Van Herck, & Sneyers, 2011: 28-29). Capital for the much needed invest-

ments is rare as access to credit is constrained and yearly profits as well as foreign direct investment (FDI) are too low (Swinnen et al., 2011: 45). Consequently, growth and development of agro-processing has been weak, particularly when compared to primary production. Processing accounts for less than 15 percent of the value of primary agricultural production (ADB, 2013: 12). Better integration into modern food supply chains, improved quality standards and stronger local brands could help to tap into that unused growth potential (EBRD, 2010). The accession to the Customs Union could theoretically prove beneficial as it increased the attractiveness for FDI and eased market access, both needed to improve the competitiveness of the agro-food industry (FAO, 2012: 10).

Fruit and vegetable sector

Food and agricultural exports accounted for about 18 percent of all Kyrgyz exports in 2015, rendering agriculture the second most important export sector after the extractive industries (see Image 3).

Image 3: Kyrgyzstan's export profile in 2015 by sub-sector

Source: ITC, 2016

While the mining industry has continuously been leading as the most important generator of foreign currency, agriculture's share has been slowly but steadily increasing. In 2011, agricultural products contributed only 11 percent to the total export value. Impressive growth rates over the past 5 years have made it one of the most promising export sectors in Kyrgyzstan, especially fruits and vegetables. They have shown a growth rate of over 25 percent hinting at the sub-sector's high potential (ITC, 2016).

According to a FAO study, fruit and vegetable processing enterprises utilize an immense variety of raw materials to produce dried fruits, fruit purees and jams, juices and canned vegetables. The raw materials are the following:

• Peas • Walnuts • Lemons • Mint • Melons • Maze • Garlic • Persimmon • Onions • Green bean • Potatoes • Apricots • Apples	• Mushrooms • Grapes • Quinces • Cherries • Beets • Pomegranates • Watermelons • Pumpkin • Beans • Tomatoes • Berries	• Carrots • Cabbages • Squash • Peaches • Eggplants • Peppers • Patison • Pan squash • Cucumbers • Pears • Plums • Others

Image 4: Utilized raw materials for fruit and vegetable processing in Kyrgyzstan

Source: Gulnaz, 2013

Most of the small and medium Kyrgyz fruit and vegetable processers are organized in the Association of Fruit and Vegetable Entrepreneurs (AFVE), which is the only organization in this sector. About 90 percent of all registered fruit and vegetable enterprises are members of the policy and advocacy association. Since 2015, also other food processing companies are able to join. By now, the association has 54 members, 37 of them are exclusively fruit and vegetable processors. Thirteen only supply domestic markets, seven focus solely on export markets, the majority sells on both markets. According to the register of AFVE members over 55 percent are registered in Bishkek or Chui Oblast (see Image 5). 45 percent are operating in four other Oblasts; Osh (17 percent), Issyk-Kul (14 percent), Jalal-Abad (8 percent) and Batken (6 percent). No fruit and vegetable processing companies are registered in Talas und Naryn Oblast.

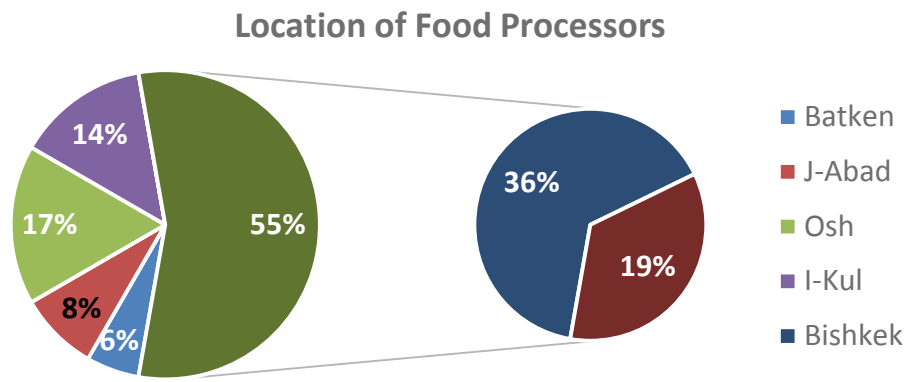

Image 5: Regional distribution of food processors in Kyrgyzstan

Source: own illustration

The reasons for a high concentration of companies in Bishkek and the capital surrounding Chui Oblast are:

1. **The proximity to important consumer and wholesaler markets**
   Bishek's bazaars are the most important domestic markets in Kyrgyzstan. Half of the fruit and vegetable enterprises sell 75 percent of their products there (Kaseeva, 2013).
2. **The proximity to export markets**
   Most exports are sold to Kazakhstan (17 percent) and Russia (12 percent). Since crossing Uzbekistan' border is difficult and expensive, almost all export goods to Russia and Kazakhstan pass the northern border of the Chui Oblast.
3. **Better infrastructure and access to services in the north**
   The Northern region of Kyrgyzstan, especially Bishkek, Chui and Issyk-Kul Oblast have access to upgraded and modernized businesses and physical infrastructure. In contrast, the Southern Oblasts still mostly rely on fragile infrastructure, and services from the Soviet times. For example, processing equipment and technology is often old and outdated, increasing the costs of maintenance or investment into new equipment (Sulzer, 2015).

Despite the clear concentration of more industrialized processing companies in Bishkek and Chui Oblast, the production centers of raw materials are found in the South, especially in the Oblasts Osh, Jalal-Abad and Batken, which have access to the fertile Fergana Valley. In 2015, the fruits' share of production was 59 percent, for vegetables 61 percent (NSC, 2016). For specific fruits or vegetables, their production center is also located in other Oblasts, for instance apricots in Batken (55 percent) or Kidney beans in Talas (90 percent) (M-Vector, 2014).

3 Concepts and methodology

3.1 Conceptual framework

In order to facilitate compliance with food safety and quality standards, it is important to understand their scope of application, their content, the governing policy regime and the mechanisms confirming compliance. The following chapter argues that official food safety and quality standards are not important in all market transactions. It further outlines the difference between food safety and quality as well as the responsibility-sharing between the public and the private sphere. These delimitations are used to identify important compliance-confirming mechanisms and to develop an assignment-specific research framework.

Markets

In developing countries, a dual economy prevails and also Kyrgyzstan subsistence production dominates. Therefore, it is necessary to distinguish between at least two types of markets where consumers satisfy their food needs. On the one hand, there are *informal* markets (i.e. Bazaars, street stalls) that *do not* comply with public regulations. Food traded here is considered safe by its consumers as they trust into the vendors' honesty and due diligence. On the other hand, there are *formal* markets (i.e. Supermarkets, international markets) that do have to comply with public regulations as they are under public oversight. Consumers are more conscious about their food and they are sometimes too detached from food production sites that they cannot rely on the vendors' words. They need an official prove that the food is safe. Therefore, the major focus of this assignment is laid upon formal markets. Here, food safety and quality standards act as market access barriers for Kyrgyz SMEs.

Food safety and quality

After knowing the reach of food safety and quality standards, it is important to understand the difference in scope of these often interchangeably used terms. According to the FAO (FAO, 2003):

- **Food safety** refers to all hazards (…) that may make food injurious to the health of the consumer. This is a minimum requirement.
- **Food quality** includes all other attributes that influence a product's value to the consumer. This includes negative attributes such as spoilage, contamination, discoloration and positive attributes such as the origin, flavor, texture and processing method.

This makes food safety the primary concern of any standard related to food production, packaging and marketing. It is their goal to provide customers around the globe with safe food. There are three commonly regulated health risks:

Table 1: Categorization of health risks

Type	Example
Radiological	Contamination with radioactive minerals or material
Chemical	Mineral contamination, heavy metals, Microtoxines, pesticide residues, Nitrates (NO_3), Sulfites, proteins
Biological	Infestation with organisms, virus, fungae, bacteria and other pathogenic micro-organisms, genetically manipulated foods

Source: own illustration

Regulations are based on scientific evidence setting limits for human consumption. They follow approaches such as "acceptable daily intake" (ADI), "margin of exposure" (MOE) or "margin of safety" (MOS). For some substances the goal is to limit human exposure to level as low as reasonably achievable (ALARA), while others are classified as "zero tolerance". Most EU and North America based companies apply the so-called HACCP standard (Hazard Analysis and Critical Control Points), which is explained in detail by chapter 5.1.

Food quality, however, is a market-based concept and here lays the most important difference between these two related concepts. Food safety is non-negotiable or exclusive while food quality attributes differ by customer group. This means that all foods entering, for example, the European Union have to fulfill all food safety requirements laid down in form of maximum level of contaminants and pesticide residues. However, importers may set additional quality requirements in accordance with their customers' demands (flavor, color, production method). Hence, a food product could be allowed to enter the EU market, but may not access a certain market segment. Consequently, food safety is both a health and market access issue while food quality is solely a market access issue. This difference is also mirrored in the choice of suitable policy options. While the government in its function to ensure public safety and health should impose inspections and controls to prevent food safety risks (s. Box), fulfilling food quality requirements of specific markets due to market forces is more efficient and does not require policing.

Early watermelon

The Kyrgyz public considers consuming watermelons in June, as risky due to assumed high nitrate levels. Where farmers aim at selling their melons early in the season achieving higher prices, they apply nitrogen fertilizers as top dressing shortly before harvesting. This can lead to the harzardous above threshold nitrate (NO_3) contents of melon fruits. Nitrate is reduced by the human metabolism to nitrite, which can be carcinogenic. Currently, consumers have to rely on personal interaction with the vendor and trust into his assurance that the watermelons for sale are safe. No official certificates ensure the safety of most watermelons sold in Kyrgyzstan. This marks a case of market failure and information gaps, where the vendor can make additional profits with unsafe but bigger watermelons without having to face negative consequences. Throughout, this study did not observe any value chain participant transmitting food safety concerns backwards to the farmer who might then continue using too much fertilizer for his watermelons. Here, the government should take the responsibility and impose controls, inspections, issuing safety certificates for watermelons and punish non-compliant producers. This renders consumers able to make safe, informed decisions and strengthen the quality feedback loops back to producers.

Policy regime

The differentiation above helps to understand the public-private responsibility-sharing that governs food policies today. The Kyrgyz policy regime in place is a mixture of publicly set minimum requirements and framework conditions leaving implementation to the private sector. Actors in the food supply chain bear all responsibility and have to prove that they did everything possible to avoid foodborne diseases. This encouraged the emergence of private retailer standards that operationalize public framework regulations and enable private actors to prove their due diligence. Private standards have often added quality standards to the mix for product differentiation and market penetration reasons (Hammoudi, Grazia, Surry, & Traversac, 2015; Reardon, Timmer, Barrett, & Berdegué, 2003). These standards are primarily process-based and sometimes even include social and environmental issues.

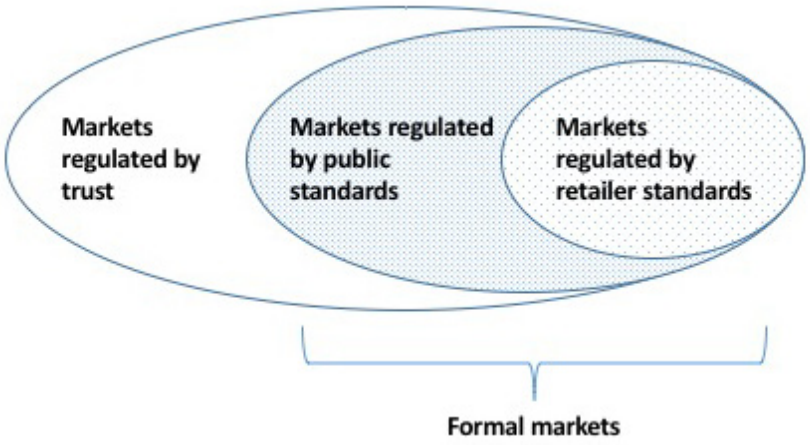

Image 6: Conceptualization of food markets

Source: own illustration

The image above visualizes market shares differentiated by the quality link between sellers and buyers. Without any standards buyers trust sellers, that the quality is right. In formal markets, standards are set for both sides formally usually by contract. The food safety linked Public Standards should be enforced, which requires agencies that police trade. A less costly way to achieve quality is reached by retailers with market-regulated standards. Here, international food markets are highly concentrated, particularly in developed countries, retailers are the gatekeepers to consumer markets. In larger market segments, they transmit their food safety and quality demands along the agro-food supply chain starting with production. Therefore, their voluntary standards achieve law-like status rendering them per se mandatory. Due to their process-based nature, they mark a shift away from end-of-line product inspection to a risk-based chain management approach relying on audits and certifications (e.g. ISO, HACCP) (Fulponi, 2007). However, not all consumers have the same safety and quality demands. Therefore, market requirements and their mandatory compliance mechanisms are heterogeneous (see Figure 1; van der Meer, 2007).[1]

Quality infrastructure in agro-food supply chains

Compliance with standards and market requirements is confirmed by using quality infrastructure services. They fulfill two very important roles in (international) agro-food supply chains. On the one hand, they conduct tests to check for health risks (ra-

1 The wide field of food safety and quality standards can also be depicted as a pyramid. While informal markets are unregulated, regulated markets are based on publicly set requirements. Certain market segments (i.e. high quality products, organic, fair trade) add additional requirements. By going up the pyramid, the size of the market decreases.

diological, chemical, biological). On the other hand, they issue certificates of compliance with standardized procedures.[2] Consequently, they create trust into global production and sourcing practices (Kellermann, 2011).

These two services – testing and certification – are now described a bit more in detail. Testing is the determination of characteristics, contents and/or quality-determining parameters of products, components, substances, etc. against specifications/standards. Depending on the respective testing field (e.g. chemical or microbiological testing) different methods of analysis, testing and/or inspection are used. Certification and accreditation are often grouped together for simplicity. Certification reliably ensures that a product and its related production process, a service, organization or individual complies with the requirements defined in written standards. Accreditation is the procedure by which an independent third party gives formal recognition that an institution or person has the technical competence to perform QI related services. Accreditation creates trust and reliability, thus facilitating international trade and competiveness. It is based on international standards.

Analysing food safety and quality compliance

To grasp the complexity of the public and private sphere in food safety standard and compliance mechanisms, a systemic analytical approach is adopted. Instead of using a classic value chain approach and adding a service analysis perspective to capture quality infrastructure services, this approach puts the quality infrastructure at the center. Thus, agro-food supply chains and consumers are operating as users and beneficiaries within a framework given by international markets. It further incorporates the demand-driven aspect of food safety standards and the gatekeeper role of retail companies. In order to enhance the system, it is important to look at the quality related polices, its institutions and services as well as the processes within the agro-food value chain determining the quality and safety of food products (see Figure 2). This approach further justifies limiting this research to distribution channels for formal markets that have a minimum set of food safety and quality standards. It is assumed that only there quality infrastructure services are of relevance (Pfeiffer, 2016).

2 Quality infrastructure is based on a number of components that are closely interrelated and form a network whose logical links are based on a technical hierarchy. Four components can be identified which have been described by Sanetra and Marbán (2007). They incorporate standardization, testing, metrology and certification/accreditation. For a comprehensive overview of the entire quality infrastructure system, please refer to Pfeiffer et al. (2016).

Based on several earlier consultancies (Günther, Beckmann, & Hanf, 2015; Kozlova, 2015a, 2015b; Kozlova & Yusupov, 2013), this assignment will focus on the following aspects:

- Quality infrastructure services delivered by public and private actors
- Enterprises and primary producers of the three selected value chains

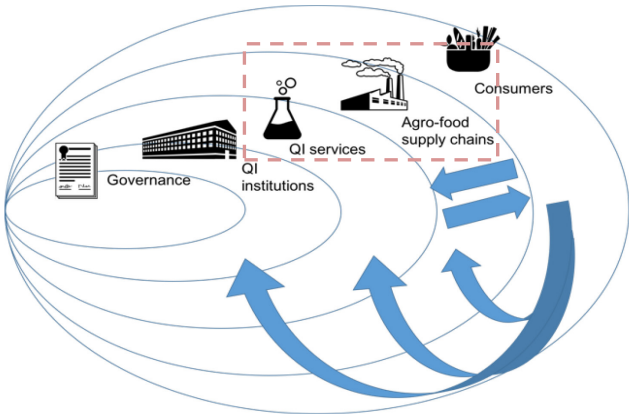

Image 7: Analytical framework of QI-services, Agro-food supply chains and consumers next to QI-institutions and Governance

Source: UNIDO, 2016

Following this analytical framework, the consultancy will look at the agro-food supply chains, namely the tomato, apple and plum value chain and their marketing. It will put a focus on formal markets, their requirements and the necessary compliance-confirming mechanisms, namely QI-services. This way, the consultancy can reveal access barriers of formal markets including obstacles for proving conformity with their requirements. Thereby, it considers QI-services as necessary but not sufficient condition for improved marketing resulting in economic growth and job creation.

Utilizing food safety compliance to create employment

Achieving food safety is considered a means to boost economic growth and eventually employment. According to economic theory, growth and employment are interdependent. On the one hand, putting people to work increases their consumption having a positive effect on the overall demand for goods and services in an economy, thus creating economic growth. On the other hand, increasing demand for goods and services boosts their production and economic growth which in turn positively affects overall labor demand. Often in developing countries, local demand for goods and services is constrained by a lack of purchasing power. Therefore, it is assumed

here, export-oriented development strategies have the potential to set in motion a spiral exploiting the assumption that economic growth leads to more employment (s. Box).

Box: Employment generation through improved food safety

Company A has a production capacity of 500l of apple juice, which corresponds the input of 1500t of fresh apples. However, currently their only client is a Kyrgyz supermarket chain with stores in Bishkek and Osh that demands 250l of apple juice per year. While they comply with the national standard for processed food, they are not meeting the food safety standards of their neighbouring countries (Russia or Kazakhstan) leave alone the EU. Demand for apple juice has been growing in these regions and is increasingly met through imports. Enabling company A to meet food safety requirements of neighbouring markets by improving their food safety processes would consequently help to increase their current plant utilization rate of 50% and thus its overall efficiency. In addition, it would increase the demand for locally sourced fresh apples from 750t to 1500t. Increased plant utilization rate and higher demand for local raw materials would ultimately create jobs, mainly low-skilled workers during harvest time and for processing. Additionally, increased production volumes require more transport capacity, another area for new jobs.

However, this upward spiral requires an integrated, three-dimensional approach. While increasing labor demand marks the beginning, it is as important to secure labor supply with a mix of interventions in the training and education sectors as well as the labor market itself in the same target area. The BMZ together with GIZ have developed such an integrated approach (BMZ, 2007):

Table 2: BMZ's integrated approach in education sector

Market for training and education	Labor market	Markets for goods and services
Employability (Labor supply)	Mediation/ Matching	Employment opportunities (Labor demand)
Basic education	Active labor market policies	Private sector development
TVET		Start-up promotion

Source: own illustration

Together with favorable framework policies for employment, it is based on linking basic education and Technical Vocational Education and Training (TVET) to labor market demands. Increasing the demand-orientation of the educational and training

system requires strong coordination and cooperation between governmental institutions, training providers and the private sector. Particularly, entrepreneurship education and the role of life skills should be strengthened.

However, employability can only be successfully promoted if sufficient opportunities to find work are available. Since private initiative and entrepreneurship form the basis of any job-creating economy, private sector development plays an important role. Apart from a conducive environment, businesses should be directly supported in their daily activities. Usually, they are faced by severe constraints related to regulatory barriers and limited access to resources. Reducing these constraints enhances the incentive to invest, innovate and improve productivity. This should entail efforts to promote start-ups. New enterprises are particularly valuable as driver of job creation.

With demand-oriented education and training in place and high enough labor demand, it is the labor market, that creates a match between qualified employees and their employers. In order to facilitate this matching process, labor market information, coaching, vocational guidance and employment services are necessary.

3.2 Methodological approach

The study results are essentially based on empirical research. In order to attain the given objectives, a qualitative methodology was chosen.

Selected qualitative methods generated in-depth as well as background information on the national Quality Infrastructure (NQI), their utilization by market oriented entrepreneurs and the related potential of creating employment in the selected value chains. This chapter describes the methodology in its aspects, the selection of interview partners, data collection methods and analysis.

Study Site

Around its regional branch in Jalal-Abad, GIZ chose this studies' research area considering its ongoing "Promotion of Sustainable Economic Development Programme". It aims at including youth in income generation, which otherwise migrates.

Rayons were chosen regarding their access to the Fergana Valley, namely Bazar-Korgon -especially at the Arslanbob forest area-, Nooken, Aksy, Suzak and Ala-Buka. Specific Rayons for plums were Ala-Buka and Aksy, for apple Bazar-Korgon and for tomatoes Nooken. Further Jalal-Abad City was a centre of research, through its importance as hub and market for small and medium entrepreneurs as well as the existence of Quality Infrastructure Service Providers (QISP).

Furthermore, this research team visited Bishkek and Osh Oblasts partly in order to acquire data on success stories as well as regional and national Quality Infrastructure.

In comparison to other regions, Jalal-Abad Oblast holds specific preconditions, despite its proximity to the production areas. Especially in terms of topography, natural resources and market linkages Jalal-Abad has its specific opportunities and challenges.

It is third largest Oblast in terms of size (33,700 km²) and second largest Oblast in terms of population (1.12 mio.) holding 192,000 ha of agricultural used land. In comparison to a total of 1.49 mio. ha in Kyrgyzstan, it is a share of 13 percent (NSC, 2016). Comparing Jalal-Abad's crop production with other regions in monetary terms, the share of Jalal-Abad is 19 percent, ranking third after Chui (26 percent) and Osh Oblast (20 percent) (M-Vector, 2014). Most of Jalal-Abad region is mountainous, except the Southern edge, which is dominated by the fertile Fergana Valley. Other parts of the Fergana Valley belong to the regions Osh and Batken as well as neighboring country Uzbekistan. The average farm size in Jalal-Abad amounts to some 0.6 ha /farmer (Sulzer, 2015) which is less than half in comparison to the national average of 1.35 ha (Kaseeva, 2013). This renders those farmers smallholders according to FAO's definition.

Common products of Jalal-Abad are well presented by the national average production, in contrast to other Oblasts, like Batken with its focus on apricots or Talas on kidney beans. Therefore, a high diversity of commodities is cultivated, ranging from typical staple crops such as wheat, maize and potatoes to the production of industrial raw material such as cotton or the cultivation of mulberry trees to feed silk-worms.

Since Jalal-Abad Oblast has the largest forest coverage (9 percent) of all Oblasts, especially tree crops, like cultivated or wild berries and fruits are common. In addition, the world largest walnut forest Arslanbob belongs to Jalal-Abad. According to fruits and nuts dealers, some 20'000 people are cracking and cleaning walnut in the Fergana Valley between October and March, and the walnut industry is therefore an important work opportunity. To see this context, this research spent a week for each value chain in the field, exposing itself to not only the processors, but also the producers or farmers.

While Jalal Abad is already remotely in a 10-hour driving distance, measured from the capital Bishkek, it still is the provincial capital for those villages, where plum, apple and tomato is grown. This study contrasted the Jalal Abad focused view with interviews of Bishkek based processors of the three value chains. These results are located in chapter 4.

Research units and sampling

Data collection focused on the market potential and QI utilization of SMEs and their related business contacts along the value chain, namely producers, middlemen, QISPs, retailers and supporting actors.

As a consequence, these value chain actors also generated research units selected for analysis during the field phase.

The groups of entities about which information were gathered was as followed:

- Small and Medium size enterprises (SME) – including exporters
- QI Service Providers
- Producers (Farmers, Cooperatives)
- Supporting actors (NGOs, implementing agencies, RAS)

The SME term follows the common definition that considers number of staff up to 250 and a turnover of less than Mio 50€ (Beck, 2005). Given the exploratory nature of this research, and the aim of finding indicative cases for QI use and success on the market, the most tolerant definition of SME as well as Micro-Small-and-Medium-Enterprises is used in this research

A combination of cluster sampling and targeted sampling was applied to identify interview partners to gather information about each research units. The sampling criteria are illustrated in table 2 and base on empirical research, validated by experts. SMEs were identified according to AFVE member registry (ANNEX 7) and the expertise of the regional Chamber of Commerce and Industry (CCI).

Table 3: Sampling strategy: SME & Producer			
Levels			
Commodity	**Tomato**	**Apple**	**Plum**
Oblast	**Jalal-Abad**		
Processor / SME	Content criteria: ▪ Type of product such as (fresh, juiced, canned, dried, etc) ▪ Location of QI need and location of QI service ▪ Size of SME (number of workers and annual turnover) Practical criteria: ▪ Expert recommendations ▪ Results of preliminary study Accessibility of interviewees		
Producer	▪ Age ▪ Sex ▪ Ethnicity ▪ Farm size		
QI Service Providers	▪ QI Relevance for apple, plum and tomato VC ▪ Existing or potential QI provider with potential for future growth ▪ Capacity for QI service provision		
Source: own illustration			

Data collection

Principal data collection methods were semi-structured interviews and expert group discussions.

Semi-structured interviews

Semi-structured interviews were the predominant data collection method. It based on guidelines, which include mainly open-ended, but also closed questions. The guideline-based structure was chosen to enable an open approach that can be easily adjusted to different interview situations. Additionally, individual attitudes of different stakeholders towards QI, employment or market potential could be gathered. This flexibility facilitated in-depth investigation with actors along the value chain and experts at different levels.

Different interview guides were developed for each stakeholder. A detailed list of interviewed stakeholders as well as an exemplary interview guide conducted with processors can be found in annex 2 and 3.

Expert group discussion

According to identify potential interviewees, deep-insights in regional value chain structure and discuss preliminary results an Jalal-Abad expert group discussion was weekly organized. Participants were associates of Lesik-Yug, UNIQUE forestry and land use GmbH , AGROLEAD and GIZ-NAWI.

Recommendation workshop

A recommendation workshop was organized and held on 13 October at the premises of GIZ, NAWI, Jalal-Abad branch. The goal of the workshop was to bring stakeholders of the local and regional levels together in order to:

- Validate the data collected and
- Discuss recommendations on market linkage improvement, QI utilization and framework conditions,

Numerous stakeholders attended the workshop. After a presentation of observations and conclusions a general discussion with all participants took place. Afterwards preliminary recommendation of the research team were discussed in small groups in order to gather specific remarks.

Procedure

At the onset of the field phase, five days were spent in the capital. In Bishkek, semi-structured interviews were conducted with QI service providers, representatives of ministries, implementing agencies and successful SMEs as well as further relevant experts.

Similarly, semi structured interviews were conducted in Jalal-Abad City. Additionally expert group discussions took place and one recommendation workshop was held at the end of the stay in Jalal-Abad. Field surveys within Jalal-Abad Oblast included semi-structured interviews with SMEs, producers, cooperatives, FBOs and supporting actors. Interviews in Jalal-Abad City and field surveys in different Rayons were conducted over a period of 2 ½ weeks.

The data collection period was finalized with another four days in Bishkek. Next to additional interviews the main task was to give two presentations of results and recommendations to GIZ-NAWI and a group of various national stakeholders. The presentation included remarks and discussion, which have been integrated in this study.

Overall, research was conducted from June 28th to July 29th , 2016.

Data collection was supported by a seconded Helvetas co-worker who translated interviews with interviewees and supported the interpretation of results.

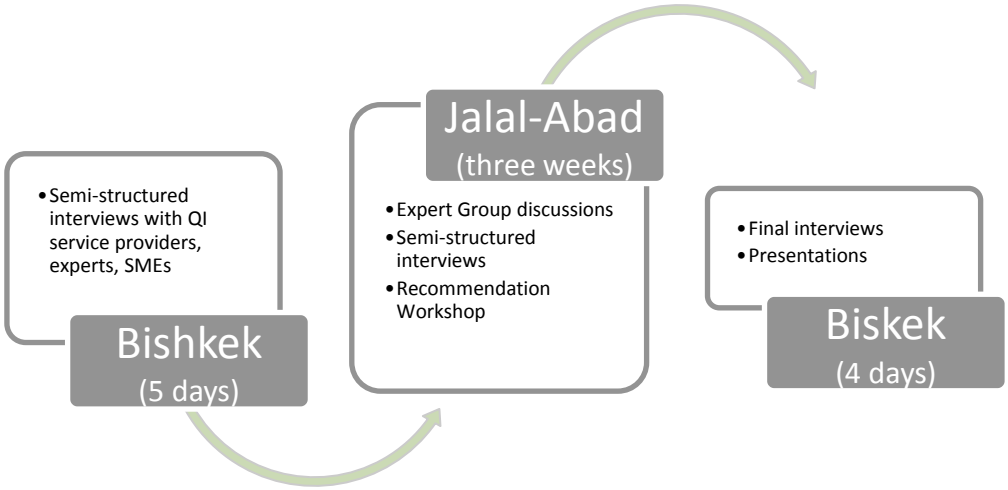

Image 8: Visualization of phases in the field

Source: own design

The field research comprises a total number of 59 interviews (Annex 1). In addition, the SLE research team carried out two expert group discussions and one recommendation workshop.

Image 9: Participants discuss draft recommendations at workshop

Source: Thomas Pfeiffer

4 Apple, plum and tomato in Jalal-Abad

With food safety and quality improvements conceptualized as a means to access markets and boost economic growth, their relevance for Kyrgyz value chain actors needs to be assessed. It is necessary to identify relevant food safety and quality standards and obstacles for compliance to develop recommendations that increase demand for Kyrgyz products creating employment, as assumed ultimately.

Jalal-Abad's regional products have their characteristics. Due to favorable climate conditions in comparison to the Northern Oblasts in Kyrgyzstan, farmers in the Fergana valley can harvest their first yield two months earlier. For some commodities, also a third planting cycle is possible within the same year. The general cropping productivity in the Fergana Valley is also significantly higher than in the northern Oblasts, like the Chui Valley (AFC, 2014). Another comparative advantage is the existence and potential of organic production. The fertile ground does not require fertilizer as much as intact ecologically sound forests do not require as much treatment as compared to the Northern region and neighboring countries (AFC, 2014). Indeed, traditionally, farmers do not use much agro-chemistry, which corresponds also to their lack of cash for such inputs anyways. Nevertheless, increasing amounts and varieties of fertilizers, herbicides and pesticides challenge the farmer when infestations or other problems occur. Despite the better traditional agriculture without agrochemicals, this misuse was mentioned not only once by these studies' interviewees and would warrant the use of Quality Infrastructure to maintain food safety and compliance.

With such high production level of raw products, one would expect more food processors regionally or in Jalal-Abad. However, only a few processors are operating within the Jalal-Abad Oblast, in contrast to the northern Oblasts Bishkek, Chui and Issyk-Kul. Therefore, high shares of raw material are traded and transported by intermediaries and processed in Bishkek or Chui Oblast or even neighboring countries. In addition, some food processors in Jalal-Abad only produce intermediate products and supply companies in Northern Oblast, which make process them, further creating final market-ready products. In this way, Jalal Abad Oblast cannot harvest the economic benefits for the regional labor market. Similarly, the presence of QI service providers in Jalal Abad does not reflect the productivity of the Oblast. The reader will find more arguments for QISP's geographic distribution in chapter 5.3.

The following chapter gives an overview about the three relevant value chains and their target markets. The latter are determining the standards that Kyrgyz SMEs have to comply with. This is followed by an analysis of compliance and non-compliance.

4.1 Overview of selected value chains

Project implementation will focus on the apple, plum and tomato value chains in Jalal-Abad Oblast.[3] While others may be added later during the implementation phase, this assignment focused solely on those three. The following part offers insights into the dynamic and structure of these value chains.

Apple

Apples are the most popular fruit in Kyrgyzstan and its production is widely spread all over the country. They account for more than 70 percent of the total Kyrgyz fruit output (JICA, 2013). Every third household is cultivating apple trees or harvesting wild apples on a total of 45,500 ha (M-Vector, 2014). However, most of these households only satisfy home consumption needs.

The predominant production areas are Chui (25.5 percent), Osh (23.5 percent), Issyk-Kul (21.5 percent) and Jalal-Abad (14.5 percent), which are responsible for 85 percent of the national production (M-Vector, 2014). Jalal-Abad, the project area, produces around 35,000 to 50,000 t of wild and plantation apples combined on a surface area of 14,000 ha (M-Vector, 2014).

Apples are consumed fresh, dried and as juice. However, only 4 percent of Kyrgyzstan's apples undergo sophisticated processing steps beyond drying. Almost all of them (99 percent) are used for apple juice. Over the past years, the apple-processing sector has grown and witnessed the entry of new firms and brands. Nine new apple juice brand names appeared nationwide in the last two years. Currently, there are over 20 officially registered Kyrgyz apple processors. Over 620,000 people are directly involved in apple harvesting and processing (M-Vector 2014).

3 For further description of the three value chains, please refer to chapter 4.2.

Pictures taken in the apple VC

Image 10: Apples

Image 11: Apple cutting device developed by farmer

Image 12: Dried apple

Image 13: Apples in washing facility

Image 14: Stored apple juice in bags ready for packaging

Source: Pictures taken by Thomas Pfeiffer

Plum

Plums are the third most important fruit grown in Kyrgyzstan, after apples and apricots. They account for three percent of the total fruit output (JICA, 2013). This is mirrored in the rather small production surface area of 5,000 ha.

Jalal-Abad is the largest plum producing Oblast in Kyrgyzstan. Its total production volume is estimated to be between 15,000 and 20,000 t on a surface area of 3,000 to 4,000 ha. Jalal-Abad contributes roughly 90 percent to Kyrgyzstan's total plum production (FAOstat). They are mostly wild plums, which are highly concentrated in 4 Rayons. Some villages produce up to 800 t of fresh plums.

A relatively low share of harvested plums is kept for self-consumption as they are mostly consumed dried. While some micro-drying facilities exist, no large-scale processing unit exists in Jalal-Abad. Therefore, most of the harvested plums are sold to intermediaries.

Tomato

Tomatoes are the most widely grown vegetable in Kyrgyzstan. They are grown on about one third of the total surface area dedicated to vegetables (10,000 ha) (NSC, 2016).

Jalal-Abad is one of the largest tomato producing Oblasts in Kyrgyzstan. It is estimated that one third of all Kyrgyz tomatoes comes from Jalal-Abad. This is linked to the fertile soil of the Fergana Valley and significantly higher average yields. Some farmers are even able to produce three crops per year rather than two as in all other parts of Kyrgyzstan (Sulzer, 2015).

About 60 percent of Kyrgyzstan's tomatoes are used to produce tomato paste, concentrate or sauces. According to the Ministry of Agriculture, tomato paste is by far the most important product. A third of Kyrgyzstan's fruit and vegetable processors are using tomatoes as raw material for their products.[4]

Value chain actors

All three value chains appear incoherent or even inconsistent, which is why this chapter treats the value chain actors briefly. Instead of analyzing the entire value chain, this consultancy analyzed the initial part of it and the elements that are relevant to transmission of quality characteristics. This consultancy could not fully clarify the reason why quality demands by customers are not transmitted to producers.

4 This is based on an analysis of the Association for Fruit and Vegetable Enterprises (s. Context).

However, it is likely that the cause lies in the nature of the value chain actors. At least, when looking at the size and degree of organization, it appears that bigger and more structured value chain actors are more likely to reach clients with quality exigencies and are therefore constricted utilizing QI. This corresponds to a comparable research in Ghana (SLE 2015). Furthermore, NGOs seem to be playing a major role in developing cooperatives, linking them to markets with international visits and so forth. It should be mentioned at that point how effectively and sustainably cooperatives have appeared in the interviews. Annex 8 contains a detailed list of Value Chain Actors.

Table 4: Value Chain facts and challenges beyond food safety issues*

	Apple (wild/cultivated)	Plum (wild/cultivated)	Tomato
Input	▪ Wild apples: **Land** is rented for 5 to 49 years. 1 ha costs 10,000 KGS/5 years ▪ Cultivating farmers reproduce local varieties or buy non-certified **seedlings** at neighboring plantations. Wild apple trees are planted by forest administration ▪ Decreasing amount and increasing average age of wild apple trees, due to missing investment. Forest administration states a lack of work force and quality seedlings ▪ Utilization of chemical **fertilizers** or **pesticides** practically unnecessary but possible. Low amounts of organic fertilizers. ▪ Exception for plums: Since infestation of fresh plums with pest and diseases became an issue, insecticides are occasionally applied, that would require QI testing ▪ **Labor** is mostly done by household members collect or harvest apples; only during the peak of harvesting season (Apple: August/Plum: September) temporarily labor is hired		▪ Average **land** size of farmers: 0.6 ha ▪ Planned contract farming shall include the providing of certified quality **seeds** ▪ Chemical **fertilizers** and **pesticides** are commonly utilized, which requires QI utilization ▪ **Labor** is exclusively done by household members
Production	▪ Harvesting, collecting and other tree management is done manually, no machinery involved ▪ Plums: on average 1-2 tons per household and year ▪ Lack of transport opportunities leads to limited selling opportunities		▪ Tomatoes are mainly produced in crop rotation on commercial family farms ▪ Up to three harvests per year are possible ▪ Crop management is done manually
Processing	▪ Minority of farmers conduct **drying**. ▪ Dried is usually by sun, some FBOs have access to solar dryers, provided by GIZ or other development agencies. ▪ **Juice production** is solely conducted by SMEs and requires advanced equipment. 50 to 500 tons are produced per SME and year	▪ **Drying** is conducted by SMEs, FBOs and farmers ▪ Dried is usually by combustion or electric dryers (SMEs, FBOs) or by sun (individual farmers) ▪ **No processing companies for jams and juices** made of plums in Jalal-Abad	▪ **Drying** and **paste processing** in Jalal-Abad ▪ Paste processing, also uses tomatoes with expired shelf life ▪ In 2015, production of the two paste processors in Jalal-Abad was 350 tons each. However, processing capacity is between 800 to 1000 tons ▪ No registered processing companies for tomato juices and sauces in Jalal-Abad
Marketing	▪ Local/regional markets are mostly supplied by middlemen with fresh and dried apple ▪ Middlemen / retailers sell juice to clients ▪ Juice packaging and labeling is not always done by the processing SME	▪ Mostly middlemen supply fresh and dried plums to Local/regional markets ▪ Large amounts are sold to Tajikistan and Uzbekistan for further processing, packaging and labeling	▪ Local/regional markets are supplied by farmers and middlemen ▪ Paste is sold directly to client or via middlemen

* A detailed description of the individual value chain elements are placed in Annex 8
Source: own illustration

Conclusion

Jalal-Abad is an important production area for apples, plums and tomatoes. While apples are mostly cultivated for home consumption, plums and tomatoes are an important tradable for local communities. Sophisticated processing takes place only for a very small share of raw materials with particularly small shares for fresh plums.

4.2 Relevance of food safety and quality standards

Consumers demand food safety and quality. Hence, it is necessary to analyse their demand in order to identify compliance gaps. Generally speaking, the dual-economy conceptualization of markets (s. Ch. 3.1) also holds true for Kyrgyzstan. All three commodities are traded on local bazaars and at the farm-gate as well as in supermarkets. In order to utilize food safety and quality compliance for employment creation under this consultancy, it is important to identify consumer markets, where certification is valued. Therefore, the relevance of certification-based food safety and quality standards for the three commodities is analysed.

In the context of quality standards, and before focusing on the priority value chains, remarks to findings outside shall be made here. Some value chains, and especially the organic products are made for a small niche, but have the potential to grow. Firstly, mushrooms are highly valuable. The encouraging part is that mushrooms are dried in a low-tech way, and GIZ supports even solar driers that successfully supply the European market. Secondly, nuts and other Kyrgyz forest products have a potential as long as these habitats exist and are maintained by Kyrgyzstan. Thirdly, medical herbs with organic characteristics, and seem to be in high demand where Kyrgyz producers already have a market share and can increase it

Apple

Besides the self-consumption, a growing share of fresh apples is sold to consumers abroad. Since 2009, the share of exported apples increased by 400 percent to 28,000 t. According to ITC, almost all of them go to Kazakhstan. However, a large share of apples is cleared at the border with Kazakhstan and further transported to other countries, mainly Russia (M-Vector, 2014).

For dried apples the domestic markets remains key. Here, middlemen and wholesalers sell dried products in bulk without proper packaging and labeling. Only a low share is exported, due to lack of compliance with export requirements, low profit margins abroad and high domestic demand. By now, Russia, Turkey and Kazakhstan

are the most important export markets for dried apple, which account for about 90 percent of exported dried apple in 2013. Germany is also becoming an important target market (ITC, 2016).

Apple juice is either sold directly as final product to clients such as supermarkets or to Middlemen who manage further labeling, packaging, transporting and marketing. According to interviewed entrepreneurs, target markets are both, Kyrgyz supermarkets, mostly in Bishkek, as well as Russian and Kazakh supermarkets. About two thirds are sold on the domestic market. In 2013, about 600 tons of juice was exported. Experts state that large distributors in Moscow can buy up to 1,200 tons of juice a year (M-Vector, 2014). First and foremost, missing market linkages and lack of compliance hinders Kyrgyz entrepreneurs to supply this huge demand in Russia and Kazakhstan.

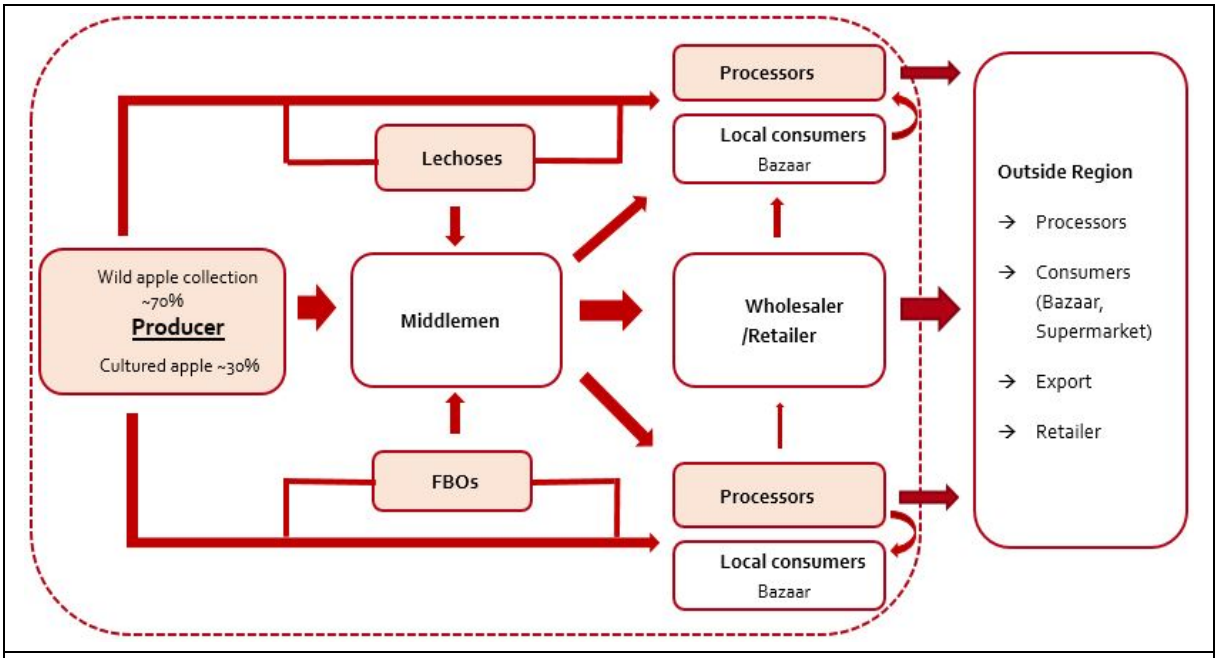

Image 15: Apple value chain actors and market channels (simplified)

Source: own illustration

Plum

Dried and fresh plums are mostly sold to middlemen, who organize further transportation and distribution. Target markets are regional bazaars as well as markets abroad, where also further processing is conducted. They are sold in bulk without proper packaging or labeling. Exceptions are a few companies in the Northern Oblasts, which supply domestic and foreign supermarkets.

Official statistics lack proper data regarding the share of exports and domestic trade of dried and fresh plums. However, interviewed farmers, FBOs and drying entrepreneurs state that the main export market is Tajikistan. In the soviet era Tajikistan was a center of plum processing. Currently, intermediaries still use former trading networks and sell fresh and dried plums to Tajik middlemen and processors. There, plums are undergoing further processing steps including pitting, polishing and packaging to create a market-ready final product. This trading behavior is further intensified by a lack of sufficient local demand and missing large scale processing facilities in Jalal-Abad Oblast.

Despite the fact that it was impossible to trace Kyrgyz plums all the way to the final consumer, an analysis of Russia's and Kazakhstan's imports revealed significant potential. While Kazakhstan sources its plums from neighboring countries (Uzbekistan (82 percent), Tajikistan (14 percent), Chile and Argentina are Russia's main suppliers (both about 37 percent) (ITC, 2016). Kyrgyz plums, if made market-ready, could have the potential to gain significant market shares in both markets.

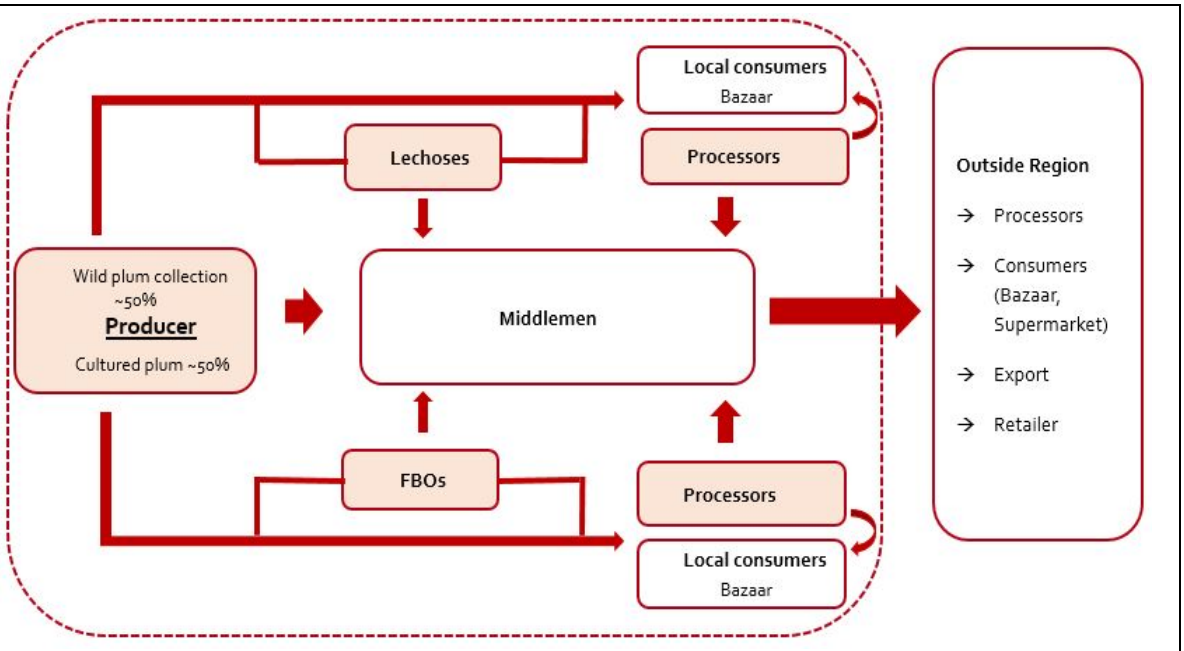

Image 16: Plum value chain actors and market channels (simplified)

Source: own illustration

Tomato

While fresh tomatoes are predominantly sold on the local informal market (bazaar, farm-gate), tomato paste – the most important processed tomato product – is sold to domestic and international supermarkets. According to interviews, demand for tomato paste is growing in Kyrgyzstan's neighboring countries. It is easier to sell abroad than on the domestic market where Chinese imports are difficult to compete with.

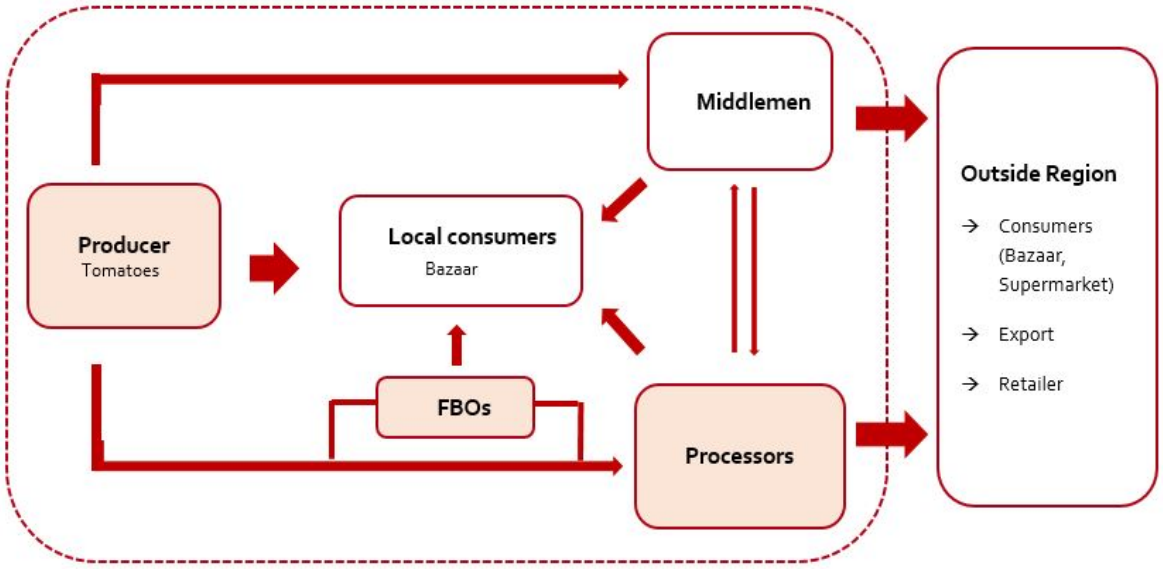

Image 17: Tomato value chain actors and market channels (simplified)

Source: own illustration

Conclusion

Looking at the three value chains, it becomes apparent that certification-based food safety and quality standards play a negligible role for Jalal-Abad's producers and processors. Most of their consumers buy fresh and processed apples, plums and tomatoes in informal markets, such as local bazaars and the farm-gate. Only a small share is produced for formal markets, such as national and international supermarkets. Main target markets are the EAEU countries. Here, food safety and quality standards become a requirement. Looking at all three commodities, it appears to be the lack of compliance with official standards that currently hinders Kyrgyz producers and processors to access the markets of their neighboring countries. In search for job creation opportunities, this consultancy proceeds with the export sector bearing the highest success probability.

4.3 International food safety and quality standards

International markets have a set of regulatory requirements food producers and processors have to comply in order to gain access. As already mentioned, Kyrgyz' products are mainly sold on markets belonging to the Eurasian Economic Union (EAEU). In addition, the EU market offers large economic potential with its well-off consumers. Therefore, the study lays a focus on the market requirements of these two markets. It does not mean that food safety for domestic markets should be neglected, the contrary is the case as the requirements for the EAEU will soon become legally-binding for Kyrgyzstan's domestic market as well.

While private food safety schemes may pose additional safety and quality requirements, the regulatory framework concerning food safety of both markets is fairly similar. Both rely on a mixture of end-of-the-line testing and the implementation of food safety management systems. Despite similarities in nature, the allowed maximum levels differ significantly (see Table).[5]

Table 5: Regulatory elements in EAEU and EU

Regulatory elements	EAEU	EU
End-of the line testing based on maximum levels for certain contaminants and maximum residue levels (MRL)	Contaminants: mycotoxines, heavy metals (similar to EU) MRL: 2 items (MRLs significantly higher than EU)	Contaminants: mycotoxines, heavy metals MRL: 472 items
Food safety management systems	HACCP principles mandatory for food processors (TR CU 021/2011)	HACCP principles mandatory to all food businesses except primary production (EC 852/2004)

Source: own illustration

Generally speaking, it can be concluded that the regulatory food safety requirements set for the EU market are higher, thus posing a higher burden on food processing companies and demanding up-to-date QISP. In addition to stricter consumer protection efforts and regulation on pesticides, enforcement of those regulations

5 For a detailed comparison of the two regulatory systems and their reach, please refer to Sedik et al. (2016). To get an overview of applicable technical regulations, please refer to http://www.gostrussia.com/en/eac-certifications/ for the EAEU and to https://www.cbi.eu/sites/default/files/market_information/researches/buyer-requirements-europe-processed-fruit-vegetables-edible-nuts-2016.pdf for the EU.

appears to be stricter. During interviews, it was mentioned that within the EAEU food stuff is traded that does not comply with the technical regulation.

In addition to public regulations, producers and processors often have to meet private food safety schemes (PFS) in order to access global markets. This is in line with the modern conception of food safety, which places direct responsibility for ensuring food safety on all operators of the value chain. PFS are designed and owned by non-governmental entities and they address environmental and social issues as well as product differentiation. They are considered an efficient means to transmit information along the supply chain and to reinforce public policy. There is a growing consensus that there has been a considerable rise in number of private food standards over the last decade. This raises the concern, among others, on the costs of certification and the requirement for multiple certifications, their impact on market access and public health as well as their prescriptive rather than outcome focused requirements (Clarke, 2010). The Global Food Safety Initiative was founded to overcome this patchwork of standards by maintaining a benchmarking process for food safety management schemes aiming at convergence between them. The most important private food safety schemes for the European market are GlobalGAP, BRC, IFS, FSSC22000 and SQF (CBI brief). The following table gives an overview about their characteristics, including ownership, members and reach (Clarke, 2010: 7-8; Havinga, 2015: 65-68).

Table 6: Food standards and their users

	BRC	IFS	FSSC22000	SQF 2000	GlobalGAP
Owners/Members	Tesco, Sainsbury's Marks & Spencers	Carrefour, Tesco, Ahold, Wal Mart, Metro, Migros, Delhaize	Foundation for Food Safety Certification	Ahold, Carrefour, Delhaize, Metro, Migros, Tesco, Walmart	Aldi, Albert Heijn, Walmart, Rewe, Edeka (Euro-Retailer Produce Working Group)
Geographic Focus	Great Britain	Germany, France, Italy	Europe	USA, Australia	Europe
Product Range	Food manufacturers	Food manufacturers	Food manufacturers	Food manufacturers	Food Producers
General management provisions based on HACCP, GMP/GHP	Yes	Yes	Yes	Yes	No
Proportion of certified companies in developing countries	20 percent	No figures available	39 percent	6 percent (mainly Asia)	No figures available

Source: own illustration

As depicted in the table, the most important PFS are set by international retailing networks and supermarkets. Due to their global operations, these schemes align with the most demanding public regulations. Hence, a diffusion of standards from most demanding to least demanding is taking place slowly but steadily aligning international standards to the quality concerns of consumers in developed countries. This means, that supplying a supermarket in the EEU could be as challenging with regard to the food safety requirements as supplying a supermarket in the EU. Further, a process-based management approach is inherent in all of them. Therefore, HACCP implementation[6] should be a primary concern for any food processing company in the world, no matter which markets they want to supply initially. Sooner or later, HACCP principles will become mandatory either through public regulations or through customer/consumer demands.[7]

Hazard Analysis and Critical Control Points (HACCP) is considered the most effective and economic way to combat food safety problems. It is a systematic preventive approach establishing production, sanitation and processing practices to produce safe foods. With policy shifts in many developed countries away from end-of-the-line product testing to preventive food safety management systems and company due diligence, HACCP became obligatory. It enables companies to control for risks and ensure that all necessary precautions were taken to prevent food borne diseases.[8] While the principles and implementation steps appear to be logical and straightforward, they pose significant challenges particularly for SMEs (Jirathana, 1998; Stier, Ahmed, & Weinstein, 2002; Taylor, 2001). The following assessment of Kyrgyz SMEs will offer detailed insights on obstacles to HACCP-implementation with a particular focus on the Kyrgyz context.

Regarding exporting to the European Union, there are several guidance documents for exporters from developing countries answering common questions.[9] Organic products already play a major role in European markets and are due to grow. Interviews showed even a niche for Kyrgyz products and a few examples found by

6 The EU published a hands-on approach for HACCP implementation for SMEs. For further information please refer to Bonne et al. (2005).

7 For a detailed description of changing patterns in global food supply chains and the impact of private food safety standards, please refer to Hammoudi et al. (2015) and Swinnen (2007).

8 For a detailed description of the seven principles of HACCP and the four steps towards implementation, please refer to Annex 9.

9 http://ec.europa.eu/food/safety/international_affairs/trade/index_en.htm, http://ec.europa.eu/food/safety/docs/ia_ic_guidance_import-requirements.pdf, http://exporthelp.europa.eu/thdapp/index.htm?newLanguageId=EN, http://exporthelp.europa.eu/thdapp/display.htm?page=form per-cent2fform_MyExport.html&docType=main&languageId=en.

this consultancy confirm the potential. Apart from that, the Dutch Center for the Promotion of Imports from developing countries (CBI) provides market analysis and information on compliance mechanisms.[10] All these information are targeted at potential exporters shedding light on the European food safety regulations.

4.4 Assessing food safety compliance of Kyrgyz SME

After having understood the requirements of formalized markets in the EEU and the EU and knowing about procedures to acquire certificates of compliance, it is important to understand the drivers and barriers to compliance and QI-utilization. Therefore, a closer look at micro, small and medium food processing enterprises is necessary.

During the consultancy, 23 companies were interviewed. Among them were 10 registered companies, five cooperative enterprises and eight micro-scale processors. Most of them are not specialized on a certain product, but rather on a processing procedure (drying, juice processing, oil pressing). Producing and selling dried fruits is by far the most prominent business activity in Jalal-Abad. This holds true particularly for the micro-scale processors. They are the least specialized enterprises as they dry and sell everything that is demanded by the market. Sometimes, even oversupplying markets lead to extremely low product prices. The registered companies, however, are rather specialized; utilizing more sophisticated processing facilities for juice processing, tomato paste and oil pressing. It is important to note that during the assessment, no final product processing enterprise for plums could be identified in the area. Also tomato processing was scarce (one operating company, another one in the process of being set up). Generally speaking, what holds true for the agribusiness sector in all Kyrgyzstan (see p. 27) holds also true for the fruit and vegetable processing sector, particularly in Jalal-Abad. Capital is scarce, production facilities are old, packaging and labeling is neglected, and the management rarely possesses sufficient marketing skills.

Regarding food safety, 12 of the 23 interviewed companies use QI-services to certify compliance with food safety standards. In almost all cases, their customers require it. Hence, they are exposed to the pressure of formalized markets to comply with the regulatory food safety policy regime. However, only five of them have so far begun with HACCP-implementation and are still far from full implementation. Their customers are mainly on the domestic market and in the EAEU. Only one company

10 https://www.cbi.eu/market-information/processed-fruit-vegetables-edible-nuts/

successfully supplies the European Market.[11] Of those QI-users, eight test their products in Bishkek and two use laboratories abroad (Germany, Russia, Kazakhstan). This means, only very few tests are conducted in Jalal-Abad. It is important to note that of the interviewed companies only registered companies and some cooperatives are using QI-services to prove compliance with food safety standards.

The following intra- and inter comparative analysis points at factors that are present among the current QI-users and are lacking among the potential QI-users.

Current QI-users

These companies are integrated into formalized food supply chains including labeling, packaging and improved processing facilities. As such, they offer insights into steps to compliance and possible obstacles.

Most of them have received training and development aid for process upgrading. All of them appear to have substantial financial liquidity as they do not rely on investment loans for construction and machinery upgrading. All are aware of the pressure by their customers to implement food safety management systems. Some even built their own laboratories to conduct tests at the facility.[12] During interviews, they showed visionary company development ideas, involved youth in their management teams and had knowledge about their product and its market potential. All of them agreed that professional support through HACCP-consultants was necessary for them to begin with the implementation of food safety management systems. They further highlighted the immense investment capital necessary to restructure and upgrade their processing towards a hygienic production. Construction of new, standard-compliant buildings or the acquisition of new technology is the two biggest expenses during the process. In addition, many said that the marketing support received by donor project in form of contributions to fare participation and sales trainings was very valuable. International fair participation brought many new potential customers and sales trainings helped to close deals. The management seemed to know the market for their product quite well and had new product development ideas in the pipeline. It was also remarkable that management structures involved younger staff (<40). The importance of English language for international supply chain integration was also mentioned. In summary, current QI users probably feel obliged by their customers to provide quality certificates.

11 In some cases, Kyrgyz products are sold through intermediaries in the EU often labelled as of Turkish origin.

12 Laboratories were observed only in two cases. In one case, tests were mainly on food quality (sugar content of apples). In the other case, a fully equipped, internationally certified food safety laboratory was being built.

Potential QI-users

Producers where this consultancy saw an opportunity to make them become QI users with relatively little effort such as information are categorized here. These companies supply informal markets. Only a few of them have heard about the necessity to provide certificates to access markets. Most rely on basic processing facilities and long-established customer-relationships. Innovation is rarely taking place. This might possibly be linked to the fact that most owners of the small- to micro-scale food processors are only part-time managers. They carry out other jobs, such as building, teaching, etc. [Interview Plum cooperative]. Among them are also truly micro-scale processors using solar-drying techniques, which currently lack market linkages and access to QI-services. They are not suited yet for formalized markets and their food safety management requirements.

Box: Micro cooperative as example for potential QI-users

A Kyrgyz company or FBO, exists of four households and serves as a casestudy: Their products are dried fruits, herbs and mushrooms. Raw materials are collected in the nearby groves, which is rented from the forest administration or sometimes bought from bazaars. An effective but expensive solar drier funded by GIZ is utilized in addition to a low-tech drier, build up with the support of RAS. Dried fruits are sold at the local bazaar or Kyrgyz companies in Bishkek, for further processing (e.g. kompot) or resale. Other marketing channels are via middlemen to other local/regional bazaars as well as abroad, mainly Tajikistan. Dried mushrooms are exported in small amounts to a French company. Remarkable are the high prices of 3 to 4,000 KGS/kg. The FBO does not have a steady contract with its clients and delivers after request, which is basically addressed a few weeks before the client wants to purchase. Proper quality management is not conducted / required by the client, neither for the exported mushrooms, nor for the other dried products. This includes the absence of any certification process as well as laboratory testing. The FBO is supported by various actors – GIZ, UNIQUE, RAS, Lesik-Yug and AGROLEAD.

However, some of these potential QI-users have begun to adopt strategic thinking and are looking for opportunities to improve their business. Despite the fact that they are familiar with concepts such as HACCP and food safety certificates, they are rarely able to implement such systems let alone knowledgeable enough. They lack expertise on food safety risks and cannot translate HACCP guidebooks into their business operation. In addition, they have yet to think about packaging and labeling as well as finding a buyer. Usually they were in the process of upgrading their processing facility. A proper food-safety management system requires more than that. Working groups need to be formed; processes reformulated and constant monitor-

ing becomes necessary. Besides overcoming lack of cash, successfully supplying formal markets also requires market intelligence and marketing skills.

Special case: HACCP implement challenges

While the principles and implementation steps for a HACCP-based food-safety management system appear to be logical and straightforward, they pose significant challenges particularly for Kyrgyz SME. SME usually serve local customers, have a small marketable output and are owned and managed by the same person. This means that they are faced by different entrepreneurial activities or a busy day-to-day existence without designated staff for long-term planning or procedural changes (Taylor). HACCP implementation, however, requires a change in mindset, expertise, resources, documentation and verification. Hence, a complex mix of managerial, organizational and technical hurdles often prevents SMEs from implementing a HACCP-based FSMS (Taylor). This becomes most evident in stage 1, the planning and preparation phase. Interviews revealed that the necessity for change is rarely acknowledged. On the one hand, they believe that they already produce safe food. On the other hand, they feel pressured by legislation rather than customer demand. In a context of low legislative enforcement and prosecution, the question arises, whether this is a sufficient motivator for such fundamental changes. Further, the implementation process requires significant human and financial resource dedication as well as expertise. Usually a working group within the company is established to prepare, plan and implement the FSMS. This puts a burden on the day-to-day business and often reveals a lack of skills and knowledge about food safety issues within the company, particularly SME. Their structure and staffing is rarely suitable for such complex procedural changes.

In the staffing context, two more observations in the training sector are important. Asking about HACCP trainings, interviews revealed very theoretical approaches. The fact based trainings did not include the concrete meaning for production. A more on-the-job nature would train more effectively. Finally, this study gathered the information that countrywide Kyrgyz HACCP trainers only amount to four qualified persons. This is hardly sufficient to retrain compensating fluctuation, let alone to prepare for the enforcement of the export quality checks in summer 2017.

A nationwide survey by the Center for Standardization and Metrology on HACCP-implementation in Kyrgyzstan sheds further light on implementation obstacles.[13] Companies that returned the questionnaire have all heard about HACCP, except one.

13 While 120 companies where contacted only 21 returned the questionnaire. Thus, it appears questionable whether the sample is representative for all Kyrgyz' food processing companies.

The majority of them (57 percent) is currently implementing HACCP or has HACCP already implemented. Interestingly, they do not see the link between HACCP implementation and market access or product quality as clearly as for example compliance with obligatory requirements. They further consider the compliance of their suppliers with GHP or GMP more important than their own compliance. When asked about the major barriers to successful HACCP-implementation they point at the huge financial resources needed, the lack of expertise to determine risks and low international recognition.

It appears that, Kyrgyz companies are aware of the regulatory requirements to implement HACCP but face difficulties with the implementation due to the lack of financial resources and expertise. Especially, the precondition to have in place appropriate processing equipment poses a significant challenge. The current facilities of interviewed processors were mostly built and equipped during soviet times and maintenance has stopped after the breakdown of the USSR. Without prompt investment these entrepreneurs will have large difficulties to extend or even keep their market share.

Economic incentives to change, such as better market access or increased profits, are not well developed. Further, food safety risks appear to stem from suppliers rather than their own operation and staff hygiene ranks higher than procedural interventions (traceability, cleaning/maintaining equipment).

This chapter contains an overview of the three value chains, along the waystations from input to marketing. The table is presented on the following page.

Conclusion

As stated above, potential QI-users differ from users by not being integrated into formalized food supply chains. They sell their products on the informal market, meaning local middlemen, bazaars and the road side. Here, regulatory food safety standards play no role. Choices are made based on price, looks and feel. No customer rewards formal food safety certificates. Hence, they are an additional investment for local food processors that bears only costs and no benefits. Their direct clients would pay the same in case of certificate or no certificate. Therefore, it can be concluded that the felt pressure by customers rather than public regulation determines the decision as to whether quality infrastructure services are used or not used. Keeping this in mind, it becomes of the utter most importance to link these food processors to new, formalized markets. In order to so, customer engagement and food safety standard compliance needs to be supported. One without the other will not achieve the desired effects. The food market is highly competitive and inflexible. Once established supply lines are not as easily substituted for new ones. Supporting

a company in its efforts to comply with food safety standards without showing it the benefits in form of new, better-paying contracts and helping them seize these opportunities will render the effort of improving food safety pointless with regard to job creation and income increases. Therefore, the project to improve food safety needs to incorporate a strong component on market linkages. To improve the processors market linkages, the following aspects among Jalal-Abad processors should be strengthened:

1. **Market intelligence**: Processors are not aware about the current market situation, possible regional, national or international competition or possibilities for support.
2. **Business network**: Processors show a lack of a functioning network, especially outside the Oblast
3. **Communication**: English and sometimes Russian language cannot be spoken fluently. Improving of negotiation skills could also be an asset.
4. **Marketing/ labelling/ branding**: Deficits in this aspect could be observed. The majority of interviewed entrepreneurs sell products in Middlemen stage to clients who organize marketing and branding resulting in low profit margins for processors.

4.5 Employment in Kyrgyzstan's agro-food sector

Among the 12 interviewed companies, with a total of 235 permanent positions, on average 17 permanent and 56 seasonal jobs were offered per interviewed companies. The number of permanent workstations varies between three and 50, and for seasonal jobs between 15 and 200. Thereof, the average women employment-rate is 62 percent, also differing in a wide range from 20 to 90 percent. Young people account for more than half of the staff on average (51 percent). However, for youth the fluctuation between companies is even higher and varies from enterprises without young people to companies with over 90 percent under 28 years. No correlations between youth employment and size, turnover, organizational form or products of the respective company could be identified.

Opinions on youth's employability are as diverse as the statistical data. The following quotes characterize the highly different opinions among interviewed entrepreneurs:

- "Young people can be trusted in commitment and motivation, they are an opportunity of success".
- "Young people often lack reliability, motives and commitment. Often they are trained and immediately start their own business or switchover to another company."
- "Agriculture is not sufficient to motivate youth staying. Agro-Business as a part for rural development with infrastructure could attract youth to stay."

Currently, most employed young people are responsible for tasks like harvesting, collecting, washing or sorting. The scope of work is mostly simple and mechanic where unskilled or labor is sufficient. No further training or promotion and encouragement take place in these roles. Exceptions to this general impression are a few companies, such as Bishkek Expo, which focuses on young employees in higher management positions and invest in their training. However, this approach reflects the individual business philosophy of a few entrepreneurs, rather than the mainstream.

Asked for their views, young people often mentioned job opportunities in marketing, agri-businesses and financial support to generate their own start-ups and enterprises. Besides labor market, many young people miss the general infrastructure in rural areas, which is available for youth migrating to bigger cities like Moscow, or generally abroad in Russia and Kazakhstan. In this way, access to schools and university, access to internet, road infrastructure and even entertainment industry are factors that motivate youth to migrate or stay. Furthermore, the University of Osh remarks the low reputation of "agriculture". If growing fruits and vegetables could be more fashionable as in "agri-business", there would be a chance to effectively hinder the ongoing brain-drain.

These observations might be partly appear contradictory, but solidly lead the team to the conclusion that keeping Youth in the area requires more than interventions in food quality or employment in agriculture. The conclusions in chapter 6.1 pick up this thought of line.

5 Kyrgyzstan's National Quality Infrastructure vis-à-vis food safety

The fourth chapter reflects the value chain specific results. In complement, this fifth chapter reflects results that are relevant to not only apple, plum and tomato and can therefore be easier applied to other commodities. In line with the problem statement, growth and job creation is assumed to stem from improved food safety and quality compliance. Therefore, it is important to understand the requirements of promising target markets and the necessary compliance-confirming service providers. Here, an analysis of Kyrgyzstan's national quality infrastructure and its processes helps determining gaps and difficulties for Kyrgyz SMEs to confirm compliance.

Wherever present, countrywide in Kyrgyzstan, QI can be utilized to demonstrate conformity. National Quality Infrastructure (NQI) should also function to support the business activities of national companies and consequently economic growth. However, because the Kyrgyz republic is signatory to the Codex-Alimentarius since 2002, it also obliged itself to maintain food safety[14]. By determining the quality of a given food product, NQI also enables the national products to be competitive[15] on the international trade market. Finally, this chapter describes, where in Kyrgyzstan what service would be available.

5.1 QI on the policy level

In Kyrgyzstan, the national quality infrastructure consists of legal frameworks and QI service providers (QISP). Furthermore, the status quo is influenced by activities or interventions in the sector, including development cooperation.

The most important two organizations are the

1. Center for Standardization and Metrology KyrgyzStandard
2. The Kyrgyz Center of Accreditation (KCA)

Both government institutions are under the Regulation of the Kyrgyz Republic Ministry of Economy (MoE). MoE's department for technical regulations is the highest technical superior QI administration. The MoE works on technical regulations partly inherited from Sowjet periods. The 13 staffs in the unit are not sufficient to

14 http://www.nism.gov.kg/kodeks-alimentarius.html

15 See also http://www.nism.gov.kg/obshhie-polozheniya-o-csm.html

translate all the legal documents from the EAEU agreement into practical executive orders.

After the disintegration of the Sowjet Union in 1989, the Center for Metrology and Standards, formerly known as KyrgyzStandard, was in charge of accreditation. However, in 2007, the Kyrgyz Center for Accreditation (KCA) was separated and became an independent authority.

KCA[16] Since its establishment, KCA has been attempting to achieve international recognition and in 2013, KCA has achieved member status with ILAC for itself and all its accredited partners. However, in November 2015, its membership has been suspended[17] after KCA partners were found being non-performing. In Kyrgyzstan, KCA is the only accreditation body. Currently, there are 92 accredited laboratories and 13 accredited certification bodies, according to their website[18]. KCA resides in the capital Bishkek and this research did not find any other branch offices. The accreditation process takes some 3 months and the costs are dependent on the number of test methods conducted.

Kyrgyz Standard: Objectives of the organization, tasks and functions were determined in the Kyrgyz' Government decree N91 during 2010. The KyrgyzStandard is accredited by KCA, following technical regulations according to EAEU standard. Besides fulfilling a policy role, it also performs tests with its Labs that are equipped with six High Performance Liquid Chromatographs (HPLC) and two Individual Chemical Agent Detector (ICAD). The KyrgyzStandard claimed that almost all required parameters to get the export-"declaratia" can be tested within its laboratories (among others: mycotoxin, pesticide and microbiological lab).
The Center for Standardization and Metrology tests about 100 products per month. Most private clients are testing at the KyrgyzStandard in order to get a certificate for export. Most clients and their samples are coming from metropolitan area Bishkek[19,20].

16 ILAC website http://ilac.org/latest_ilac_news/kca-suspended/ KCA, KYRGYZ REPUBLIC SUSPENDED The signatory status of KCA, The Kyrgyz Center of Accreditation (The Kyrgyz Republic), to the ILAC MRA for the accreditation of testing laboratories using ISO/IEC 17025 was suspended on 4 November 2015. This suspension is a result of the decision taken at the 15th Meeting of the ILAC Arrangement Council held on 4 November 2015. Posted on 25th November 2015

17 Conclusion: With KCA's re-accreditation, nearly a hundred Kyrgyz labs would acquire recognized status.

18 http://kca.gov.kg/ Реестры/organy-po-sertifikatsii-produktsii-i-uslug.html

19 Conclusion: The fact that most samples originate around the capital Bishkek hints at a lack of service in rural areas.

20 BSK001

State Inspectorate

Outside or better above of the technical ministries is the state inspectorate. It is attached to the prime minister's office similar to internal audit and equipped with corresponding authority. Legislation decrees, the state inspectorate being under the prime minister authority which is hierarchically above the line ministries health/agriculture/economy. What renders the State Inspectorate special is its authority, and at the same time its countrywide presence and operations. The Prime Minister managed State Inspectorate, actually corresponds to a QI provider on the strategic policy level. In all the villages where this research conducted interviews, the state inspectorate was present:

- Well staffed –particularly for veterinary inspections –,
- Well equipped for example with microscopes and
- Well connected and utilized.

The state inspectorate performs assessments of

- Veterinary and
- Phytosanitary kind

The veterinary inspections are the majority among the activities with some 75 percent. Phytosanitary inspections however only amount to a quarter of all inspections. Interesting here is the model of a half-privatized / outsourced veterinary inspectors. For a fee, these honorary inspectors or Para vets perform the inspection task and utilize the equipment and know-how from the governmental inspection service. The Vet-inspection seems to operating effectively and efficiently in rural areas, while the phytosanitary services are understaffed and underequipped.[21]

Sanitarian Diagnostic Laboratory of under the (MoH)

The Ministry's federal agency is responsible both, for strategic policies and for the implementation of health policies through its lab capacities. On the operational level, it runs nine sophisticated labs in seven oblasts and two more, as well as 40 basic diagnostic labs on rayon level. The main two labs in Bishkek and Osh will be upgraded with funds from Russia and Kazakhstan worth up to six million US$.

Division of labor is structured in the following way:

- MoH tests processed products such as apple juice
- KyrgyzStandard, MoA and inspection services test raw products

21 Conclusion: If nothing prevents the phytosanitary inspections to be like the Veterinary inspection service, why should it not be replicated.

All governmental QI stakeholders are shown on the following chart that summarizes the situation well.

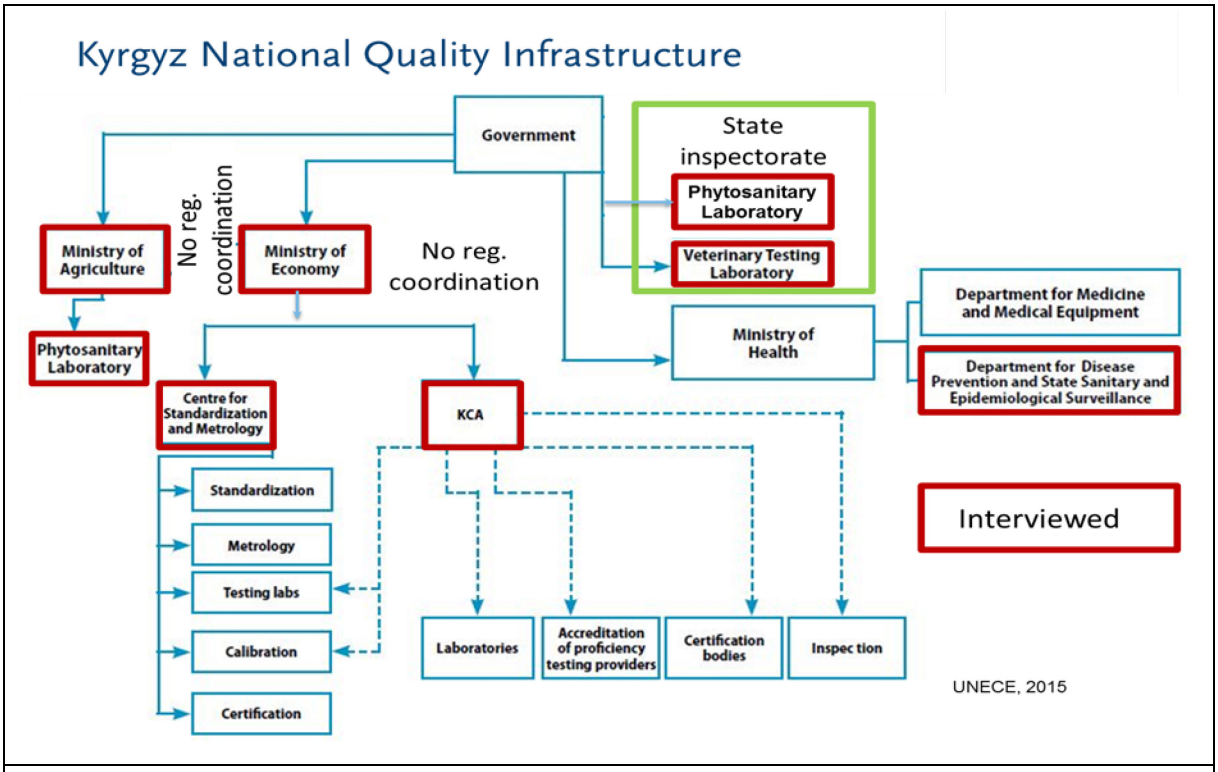

Image 18: QISPs or operational QI providers in the Kyrgyz NQI

Source: UNECE, 2015

Quality Infrastructure Service Providers (QISP) include governmental policy stakeholder discussed above. The remaining operational ones are mostly private service providers. In the area of this study's concern in Jalal-Abad, only one such QISP occurs and was interviewed. Yntimak does veterinary inspections and measures Nitrate in fruits and vegetables. In Jalal-Abad no other private QISP was found.

QISP candidates

Potential QISP are relevant to this study since German or other Development Cooperation stakeholders might chose to support some. Besides existing QI stations in some companies, monitoring the food production processes, only Universities might be called a QISP candidate. Surely, the Technical University in Kyrgyzstan's capital Bishkek deserves this rank. However, operationally more interesting – because closer to Jalal-Abad – is the State University in Osh. Anorganic and Organic Chemistry are taught to potential future QI staff and are researched. In this way, the Osh

State University, Chemistry Department has the necessary equipment and potential to provide QI services.

Interventions

The National Quality Infrastructure is subject to interventions both by the national government, but even more by a number of donors, where the most pertinent shall be described briefly. Presently the Government manages the Export Development Plan of the Government of the Kyrgyz Republic for the period 2015-2017. Objectives of the EDP are the creation of "favorable conditions for export and so the support of small and medium-sized enterprises".[22]

On 16 May 2016 the World Health Organization WHO together with the Kyrgyz Ministry of Health launched the initiative "Good Laboratory – good health"[23]. By order №18 of the MoH from 16.01.2015, the ministry aims at improving the health laboratory performance and capacity. However, this medical capacity flanks and exemplifies both, the QI labs since level of technology as well as requirements for equipment and staffs are very similar[24].

The EAEU has launched an equipment program until 2020 with the aim to facilitate trade among the Member States Armenia, Belarus, Kazakhstan, Kyrgyzstan and Russia. This program foresees furnishing provincial Kyrgyz cities with equipment necessary for conformity checks of export products within the EAEU.

While it concerns health laboratories, it is worth mentioning that the European Union's Delegation finances a project strengthening the health-lab system. This program does not show any signs of coordination with food quality labs. However, health labs and food labs require similar technology and staff qualification and therefore coordination would make sense.

Under Federal German BMZ's financing both GIZ and PTB operate in the NQI sector in a coordinated fashion. While PTB works through a regional program also with the neighboring countries, GIZ links NQI with its economic programs such as the NAVI.

With funds from the Swiss Development Cooperation in relevant value chains quality and the necessary infrastructure will be developed by GIZ and partners.

22 Governmental Plan for Export Development of the Kyrgyz Republic for 2015-2017

23 http://www.med.kg/index.php/novosty1/789-khoroshie-laboratorii-krepkoe-zdorove.html

24 Conclusion: a coupling of the about 50 health labs with the QI labs might not only save costs but also widen the scope and customer friendliness.

5.2 QI processes

A typical export certificate process for a customer in the EAEU could be structured in the following way of four steps:

Table 7: The typical certification process, here export

#	1	2	3	4
Step for Export to EAEU	Phytosanitary Certificate (raw Material)	Sanitary Epidemiological Conclusion	Certificate of Origin (Voluntary)	Declaration of Conformity
Kyrgyz Actor	Phytosanitary Laboratory MOA or State Insp.	Regional Sanitary Inspection MOH	Regional Chamber of Commerce	National Center for Standardization and Metrology

Source: own illustration

In graphic form, this would look like the following:

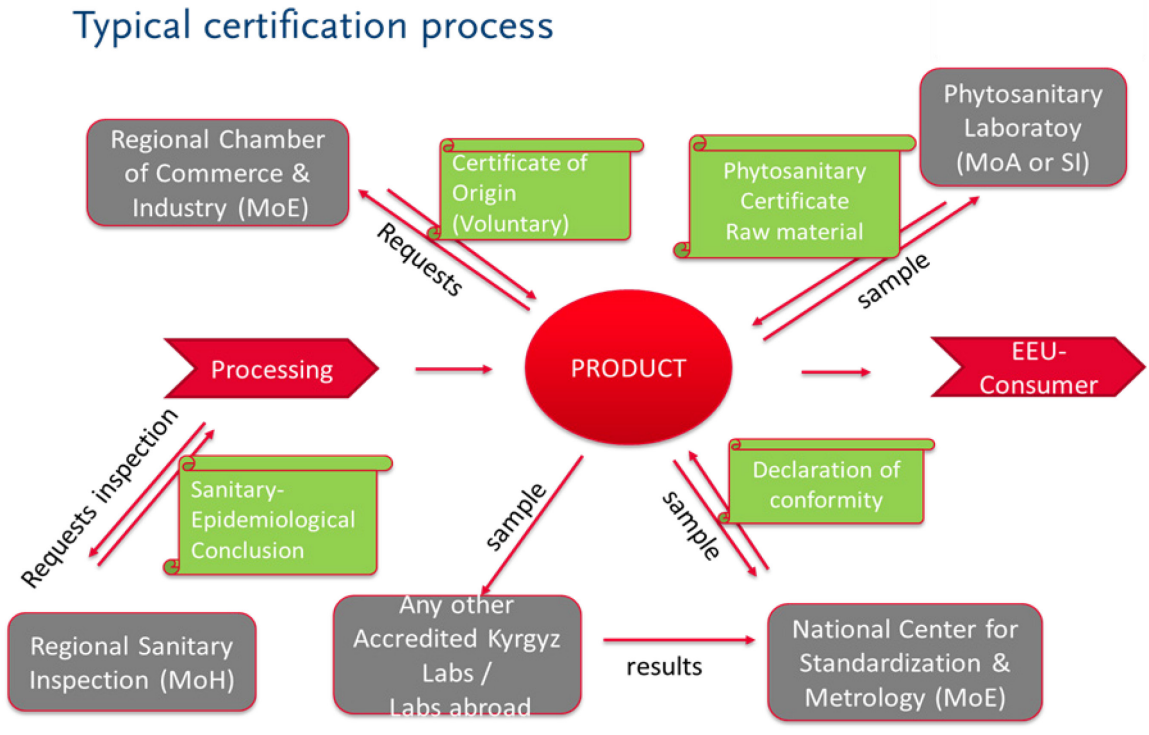

Image 19: Typical certification process

Source: own illustration

Even in the graphic form, the export certification process is not straightforward: Involved QI service providers, partly duplicate analysis. In order to feedback the results into the production process, an exporter is required to dispatch samples and collect the same results.

Besides the processes for entrepreneurs obtaining certificates, for instance for export, there is also the change process towards a production setup that contributes to preventing quality issues or customers rejecting.

5.3 Geographic distribution of QISP

After already the hint was collected that QI customers have to invest time, money and efforts to utilize QI, here a deepened analysis is performed. Entrepreneurs informed the study about their confidence in QI use, when the service is offered at the location where the analysis is needed. Furthermore, sampling has such an important impact on the results that also lab technicians can only formulate sharp feedbacks, if an entrepreneur is present for questions and answers. However, this comes at a cost of investing time to facilitate this. Plums are grown within rural Jalal-Abad in Aksi. From this place typical for rural production and hence an example, a Gedankenexperiment was done with interviewees. Concretely, interviewees were asked to estimate costs and time, necessary for QI tests that are only possible in sophisticated labs distant from the rural production area. Depending on whether the samples need to be analyzed in the next town, city or the national capital, costs and time were acquired.

Table 8: Time and costs involved to reach QISP from a South Kyrgyz rural production area (plum)

Geo-Level	QI Provider	Time to travel, test and return	Travel Cost for 1 sample (Secondary)
Capital Bishkek	Special tests	5 days	12'000KGS
Oblast Osh	Phyto-tests	3 days	4'000 KGS
Rayon Aksi	Vet-Serv, MFA	2 days	2'500KGS
Village	Hon. Vet-Serv	1 day	500KGS

Source: own illustration

The table above shows how many efforts QI customers have to pay in order to effectively utilize QI. Travel costs are mostly linked to the accommodation, since delivering samples and returning on the same day is hardly feasible. Tests even take days and so utilization of more high-end quality infrastructure like in the capital requires a week's time and some 12'000 KGS. The costs correspond at the value for plums for example with less than 20KGS/Kg to 600 Kg of plums that would need to be invested. The time needed also hinders QI use, because of a processor manager needing to dedicate more time to quality rather than his production bearing sufficient time burden already. The necessary time also requires theoretically production to stop until the results are available. Practically, to avoid QI tests with large time budgets are tempting and correspond to the research team's observations.

This study concludes: Investing for QI tests is way outside the possibilities of a farmer. It is more likely that with higher trade volumes, QI tests in the capital might be worth it. Furthermore, the conclusion seems justified that QI would enjoy more utilization if services would be offered closer to the customer. In this way, samples could be brought more easily and cheaper to labs, QI test results could be swifter.

This circumstance above actually is flanked by the distribution of QI providers countrywide. As basis for the analysis, the list of KCA's accredited labs was taken. The result is shown in the map below.

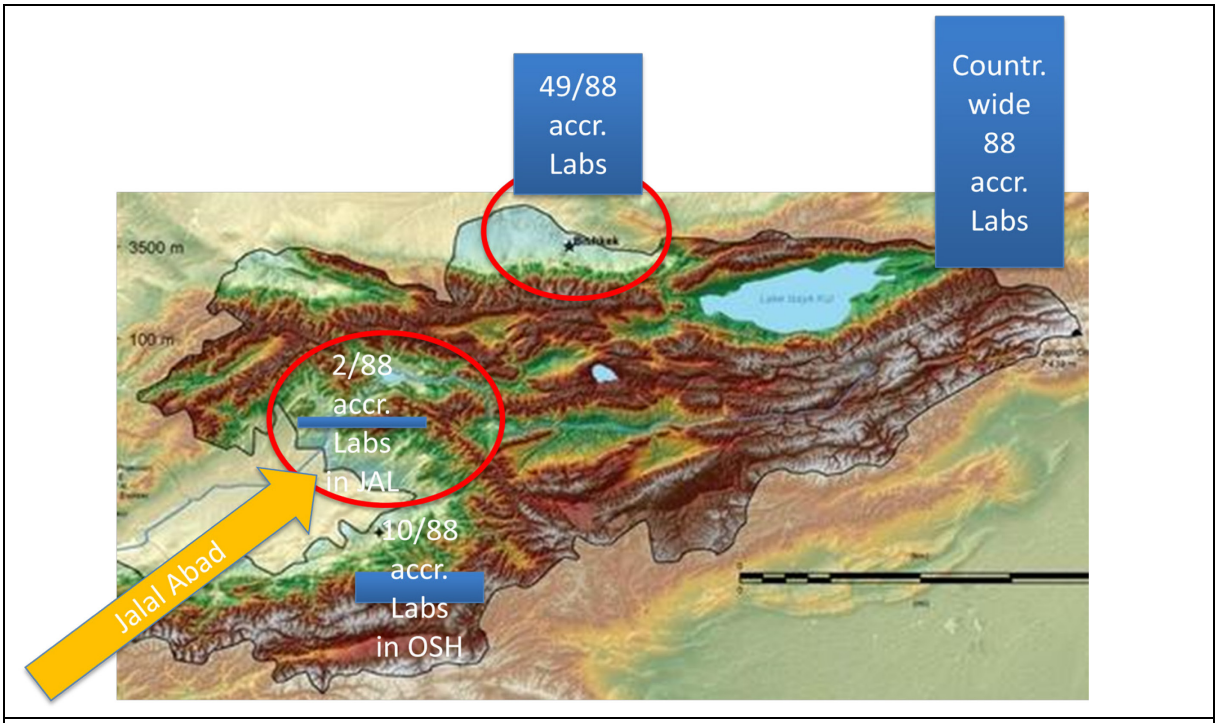

Image 20: Distribution of KCA accredited QISP around Jalal Abad

Source: own illustration

In the capital Bishkek, 49 of the accredited labs or 56 percent are assembled. In the biggest southern town Osh, some 10-car-hours away from plum production areas, 9 labs are located, which corresponds to 10 percent of all labs. Remarkably, only two QISP are suitable for food and beverages. Most others deal with petrochemical products, textile, civil engineering or medical products.

In Jalal-Abad, the situation is even scarcer because only two QISP are accredited and only one of them allows rudimentary testing. Expected by the TOR and planned by the outputs, this study mapped the QISP, particularly the authorities in the sector. The table in ANNEX 5 charts the governmental QISP that are relevant to this study.

5.4 QI system challenges grouped by production method

This report is going to present how the QI system is dealing with health risks, quality issues and other challenges in the three value chains; plums, apple and tomato. However, contaminants and subsequent health risks might result from process specific causes. Furthermore, some conclusions of their analysis might be helpful also for other comparable value chains. For instance, apple and plums belong to the pomicultures that also are comparable to pear, walnut, apricot and other.

The same is valid for production methods of food products. Drying for instance typically does not lead to sterilizing the product. However, when tomato paste is made, raw tomatoes are heated to temperatures of 80°C that sanitizes the product, which then is sealed in a tube or can. In this way, the product types are categorized. Therefore, typically tomato paste does than not carry bacteria and poses no health risks due to its production method.

Three reasons lead to a result description by product type in this chapter. Firstly, each production type requires a set of quality infrastructure services to determine health risks, or better exclude them. Secondly, within a given production type group, such as jarred, a common risk can be formulated which corresponds to the HACCP approach discussed in chapter 5.3.2. Thirdly, among the various production methods a degree of process sophistication can be formulated, from low-tech to industrialized. In the context of this study for the target group of rural youth, this level of industrialization becomes relevant.

Table 9: Health risks per food category and value chain categorization of foods with QI services

Health risks per food category and value chain	Categorization of foods			
Value chain	**Products dried**	**Products canned**	**Products juiced**	**Product raw**
Apple	Applejuice, dried apple for compot and teas; infestation hydrocyanic acid Piperonylbutoxid, Organozinn	Apples could be sold as apple sauce like in Europe, but no such products were observed	Applejuice	Raw apple for regional markets and Bishkek
Plum	Dried plum; infestation hydrocyanic acid Piperonylbutoxid Organozinn	frequent use of jarred, pureed and jammed plum jam, are sold in Europe		Raw plum for regional markets and Bishkek
Tomatoes	Not dried yet despite dried tomatoes being widely consumed in Europe. Nitrate (NO_3)	Tomato paste is sold in jars and tubes. Nitrate	While tomato juice is valuable for the EU market, no such product was observed in KG, NitrateO_3	Nitrate easily mechanically damaged
Health risks	microtoxine (aflatoxin, etc.) and bacteriological contamination	Content based health risks such as residues	If not pasteurized, bacteriological contamination, content based health risks (residues)	Bacteriological contamination
QI services necessary to determine conformity.	Toxicological laboratory, bio-lab also mobile	HPLC	HPLC, bio-lab also mobile	bio-lab also mobile
Degree of Industrialization	Low	High	Middle	

Source: own illustration

As a conclusion from the above, the necessary QI services can be derived that further down play a role in the examined services of the national quality infrastructure. By installing QI services close to the sector for dried products, the biggest effect can be achieved with the smallest investment.

Dried

Health risk: bacteriological contamination, moisture measuring and microtoxine (aflatoxin, etc.)

Necessary efforts by NQI

Low for moisture measuring and bacterial. detection

Juiced

Health risk: bacteriological contamination

Canned

Health risk: residues

5.5 NQI performance before EU market requirements

This chapter shall give a short comparison of the gap between the Kyrgyz domestic QI policy, capacity and quality and the international standards. Based on the top 10 export markets for Kyrgyz products, two markets have been chosen.

- EAEU (Armenia, Belarus, Kazakhstan, Kyrgyzstan and Russia)
- EU (28 memberstates)

As a starting point, this report reflects the performance vis-à-vis EAEU regulations based on official reports and QI providers. In a 2014 research it was found that for dairy product some 39 to 45 percent of the necessary parameters can be determined by the Kyrgyz NQI. While for Fruit / vegetable products no such report is at hand, the QI providers themselves only claim being in position to test up to 80% of necessary chemical parameters.

Conclusion here is that growing the extend of parameters measureable in Kyrgyzstan would lead to more utilization and increase competitiveness of Kyrgyz products.

Next, pesticides are used here, as one of the most interesting indicators because of their residues' health risks. Annex 6 describes in detail three benchmarks that lead to the following conclusions:

- Since SME interviewees stated the sufficiency of the Kyrgyz NQI for exports into the EAEU, the study concludes that continuation preserves already existing jobs. However, the experts claim that only parts of parameters are measurable in Kyrgyzstan. This corresponds to this studies observation of foreign NQIs being used.
- However, having conformity with EAEU regulations, Kyrgyz NQI is far from its ability to check conformity for exports into the EU.
- Already, the 573 pesticides that would need to be checked for exports into EAEU, is long. However, the list of 1344 pesticides is an even more challenging task. Presently the Kyrgyz NQI does not have the means to check conformity for imports into the 28 European countries (EU28). This is even more regrettable, since the organic ready-to-pay-markets are therefore out of reach.

5.6 SWOT analysis for the purpose of creating jobs

SWOT analysis of the potential to "create export and job opportunities through quality of plum/apple/tomato products"

Table 10: SWOT analysis for the purpose of creating jobs

Strengths	**Weakness**
▪ Apple and Plums (like walnut, apricot, and others) are by default bio products; ▪ Kyrgyz NQI is in position to certify for EAEU export. ▪ Central QI services are relatively well covering for the purpose of export into EAEU ▪ Kyrgyz Labor is cheap ▪ Kyrgyz labor enjoy good schooling ▪ There is hardly any language barrier for export to the EAEU ▪ Simple lab tests are partly no-cost or for free.	▪ Plums / apples are vulnerable to infestation ▪ Barely any tracing of Kyrgyz products; ▪ The Kyrgyz phytosanitary inspection service is only a quarter as strong as the Veterinary services. Weak decentral NQI presence Rudimentary rural QI services for plum/apple/ tomato ▪ Vis-à-vis QI customers, a confusing division of labor exists between Ministries for Agriculture, Health and Economy as well as the State Inspectorate. ▪ Limited customer interest in quality and rather acceptance of poor quality on domestic markets; Limited customer protection. ▪ Poor transport infrastructure in Kyrgyzstan, that renders selling at low price to Uzbekistan more opportunistic ▪ Kyrgyz products are sold to Tadjikistan and Turkey at a low price, without using the opportunity to capture profits. ▪ Kyrgyz youth misses job opportunities, access to infrastructure and perspectives for rural areas
Opportunities	**Threats**
▪ Apples, plums and other Kyrgyz products are consumed on the EU Organic market and attract with high prices. ▪ Apples are not purchased by Russia from other EU sources since the embargo raising the demand in Kg ▪ Intersnack purchases nuts from Jalal-Abad and performs HACCP trainings ▪ Generally, unemployment renders labor available and cheap; ▪ Limited number of south Kyrgyz companies enjoy CCI export promotion ▪ Veterinary inspection services in rural areas are strong and appear efficient, since services o honorary inspectors are utilized. There is a job creation opportunity in establishing a phytosanitary inspection service similar to the Para-Vets ▪ Customer protection could benefit from a "more public" QI service.	▪ Uninformed farmers could contaminate pomicultures like apple and plums with pesticides, once they have the opportunity. ▪ Kyrgyz forests are still mostly intact and host plants that become products with high value, but are threatened by poachers such as in the walnut forest. ▪ Kyrgyz Quality infrastructure often does not allow testing all necessary parameters for export to EU and EU QISP are performing tests. ▪ Kyrgyz youth prefers low wage jobs in Russia over agricultural work in rural Jalal-Abad, risking brain drain of rural areas

Source: own illustration

While not all aspects of the above analysis can be discussed here, three aspects and conclusions deserve more attention.

The line ministries responsible for agriculture, health and economy as well as the State Inspectorate under the prime minister operate both on the policy and operational level. An entrepreneur intending to export agricultural products has to consult at least three of the institutions. Some of the same tests even need to be done by more than one lab. As observed in Ala Buka Rayon in Jalal-Abad, there is even no regular coordination. Therefore, the study team concludes, that their division of labor in the QI sector are both unclear and partly overlapping.

Honorary inspectors for Veterinary inspections in rural areas are effectively and efficiently operating with six times more than the phytosanitary inspectors amount to in terms of staff. These honorary inspectors or Para-Vets were trained by the governmental services, obtained a license and charge their customers with fees. Such honorary inspectors borrow equipment from the governmental inspection services, for example microscopes.

An Interview with a Bishkek based supermarket indicated low interest in quality, but mure in cheap products. There is even reason to believe, that typical Kyrgyz and EAEU customers have low interest in quality in common. As long as the price is right, quality becomes acceptable. While Kyrgyzstan's Ministry of Health is in charge of food safety from the governmental side domestically, many more private initiatives would be necessary to gain sufficient momentum for consumer protection in country. However, this is unlikely, given the separation of customers between the EAEU Member States as well as their limited purchasing power. Nevertheless, the only sustainable way to enforce industry changing their modus operandi is to avoid purchasing agricultural products that are not acceptable to customers. The Kyrgyz and EAEU national QI systems could contribute to informed and choosy customers.

6 Comparison, analysis and discussion

General economic frame

Chapter 1 and 2 depicted a generally difficult economic situation on the macro level with a loss of foreign currencies due to Kyrgyzstan's need to purchase many products internationally. This trade deficit is only partially compensated with selling gold on the international market. This was less relevant during Sowjet times, when borders between its Member States did hinder trade yet. The resulting poor economy has contributed to little investments in roads, electricity, education or other infrastructure. However, poor roads not only contribute to bruised fresh plums in Bishkek, let alone transport abroad, but also hinder youth traveling to the countries' capital with better educational facilities than in rural Jalal-Abad. This circumstance aggravates the already significant ethnical divide between the South and the North.

Lack of cash and difficult access to loans furthers the issues. Banks charge up to 30 percent annually due to high costs, for insurance, cash provision and hedging In remote places, such loans would be most importantly needed, but it is right there, where loans cost a lot for a processor, let alone a farmer. Often, entrepreneurs struggle with demonstrating formally their worthiness towards banks. Rough and inappropriate pay-back schemes exacerbate the already difficult access to loans.

Small and Medium sized companies enjoy much liberty, but are vulnerable to market changes. Entrepreneurs and start up managers are combating a challenges on multiple fronts, which renders their enterprises at high risk. As a response, interviewed managers seemed to run more than one project, in order to diversify risks. However, this understandable reaction is diluting their efforts in a given high quality business. One way out of this could be formal markets with more business security.

On the microscopic level the population has partly experienced the Sowjet Union's centrally planned economy, when market oriented attitudes were displaced, which partially still lasts as an excuse to focus on production. This generation is increasingly replaced by a younger generation that has a market-oriented attitude. However, this young generation commonly seems to have little faith in the development of its own country, particularly in Kyrgyz rural areas. A significant change in values between young and old deepens the generational divide.

Youth and employment

While a World Bank study argues that the Kyrgyzstan's employment challenge is a challenge of growth, others suggest that also matching and labor supply are problematic. Accordingly, young people are confronted with a situation of lacking oppor-

tunities, informal networks dominating the job search and insufficient skill development. In Kyrgyzstan, the educational system, particularly in rural areas, fares poorly leaving youth ill prepared for the job-market. Most young people have completed secondary education (85 percent) during which they acquire mostly home-related skills (KAP, 2011: 19). Only 15 percent attain a higher education. Many of them state that they need special training, education or credentials and think that they don't have it nor are in a position to get them (KAP, 2011: 29). This might hint at an educational system lacking demand-orientation in its skill development plan. However, while this might be partly true, and given the relatively well-developed educational system, it is more likely, that youth repeats what the labor market replies to their application. When turning youth's applications down, the reason is more likely the lack of job opportunities.

In addition, informal networks dominate the job search and career guidance of young people. This significantly narrows their view on economic opportunities outside of their social environment. Particularly in rural areas, young people aspire similar jobs as their parents (KAP, 2011: 34).

In addition to those difficulties seizing the existing economic opportunities, they themselves are scarce. Job creation is lagging labor force growth, since the small formal sectors does not create employment. Despite significant growth rates of 6.6 percent, job growth was only 0.4 percent. This is linked to growth being led by a few, larger companies. Studies on employment creation have suggested that smaller and younger firms are more likely to innovate, grow and create jobs. Particularly the entry of new companies is considered promising (Sattar, Keller, & Baibagysh, 2015; World Bank, 2015).

Possible theoretical solution that was rejected after internal discussions:

Youth could bridge the difficult and time-consuming exchange of samples and results between processors/farmers with QISP. Youth would collect the samples in remote places, transport them to QISP, wait for the results and interpret them for the farmer / processor. Youth would hereby also consult the farmer how to fertilize, fight pests and more generally manage the field in order to optimize the quality characteristics. The young entrepreneurs charge for their service and would learn about agri-business and quality indicators:

Advantage:	Youth would be directly employed.
Disadvantage:	Effective only if it is part of a comprehensive package. It might even be necessary to develop regionally.

Faced by this situation, youth is currently heavily involved in family labor. While 11.5 percent are unemployed, more than 50 percent of the employed are in a position of vulnerable employment (Elder, Barcucci, Gurbuzer, Perardel, & Principi, 2015: 28). Currently, amongst young men, they are mostly employed as agricultural worker (39 percent) or in crafts and trade (23 percent) while young women are mainly agricultural workers (55 percent). Services play a minor role (~18 percent) (Elder et al., 2015: 5). Most of them are engaged without pay in a family establishment or farm (42 percent) (Elder et al., 2015: 5). When asked what type of business they would open young women most commonly would propose to open a tailoring business, most young men are planning to open a business in agriculture, animal husbandry or car repair. Proposals for trading businesses were common for both genders (UNICEF, 2011: 30-31).

While this studies' observations contrast this finding, it could be explained with youth wanting to work in agriculture, because of lack of alternative opportunities or family ties.

This opens up the possibility for significant employment effects, if the demand for agricultural products increases. Hence, facilitating market access for the agro-food industry bears a large potential for job creation. Improving the compliance of processing companies with food safety standards, makes new markets accessible for them, which will ultimately increase demand for their products (see Box). Increased demand will create opportunities for low-skilled workers during harvest time and for handling and processing. In addition, increased production volumes demand for transport capacity, which is another area for new jobs. Apart from these low-skilled jobs, improving food safety processes for an entire value chain requires skilled consultants and food safety technicians for lab testing and process management at company level. It further requires trainers and advisory services targeted at farmers, in case the latter have to change their production procedures. However, most of the advisory and consultancy services are currently almost entirely donor-funded. Unless service clients begin paying for the services they receive, these jobs will not be sustainable. Once donor interest fades, they will probably cease to exist as well.

While the measure will create more labor demand, labor supply and matching cannot all be tackled by the Sustainable Economic Development Programme alone. Instead, a comprehensive regional development would probably be more effective to attract youth staying in rural southern Kyrgyzstan.

On general employment terms, only where plums, apples and tomatoes are processed, a need for quality infrastructure arises. The more industrialized the processing, like tomato paste, the fewer workers are needed because processes are au-

tomatized. On the contrary, more basic processing yields more job opportunities. In drying, the most simple conservation technique is utilized which is already done on farm level. As chapter 5.3.4 showed, drying requires two simple QI techniques, bacteriological testing and moisture content. Both are tests that can be done not only on field level and don't require test labs that are only available in Kyrgyzstan's capital.

Employment by quality infrastructure is not trivial to create in Jajal Abad (See box above). Farmers did not enjoy the necessary education for jobs as in laboratories. However, it would be possible to create employment in phytosanitary inspection. No sophisticated equipment is needed for that, only a good eye. Similarly to the Para-Vets from the State Inspectorate, such Para-Phyto specialists could be trained by the authorities and become honorary inspectors.

From farm to fork

The Kyrgyz society, as well as the consumers from countries where Kyrgyz products are exported to, have to struggle economically and therefore look at price of products rather than quality. Once a fresh apple for instance is not squeezed during transport leading to brown spots, the minimum requirement for a consumer in Bishkek, Astana or Moscow is fulfilled. Hardly any buyer asks for an apple without pesticides or tomato without nitrate. This low awareness for quality coincides with an even smaller readiness to pay for quality. This consumer attitude does not motivate authorities to strengthen consumer protection laws and quality slips out of attention. Kyrgyzstan obliged itself to follow the farm-to-fork policy and, since 2002, is signatory to the Codex Alimentarius. However, on the farmers' level is little encouragement to produce food-safe apples, plums and tomatoes. Vis-à-vis the Codex Alimentarius, the question is unanswered, which farm delivered to which fork. This poor traceability and poor labeling would be a necessary condition for transparently communicated quality. If at all, Kyrgyz plums, apples or tomato are only seldom traceable down to the level of a cooperative. However, it is sufficient that a single farmer, who is over-fertilizing, might lead to excessive residual levels. Furthermore, even if a batch of apples would be traceable, labels are hardly printed and describe the content.

Other value chains are partly similar and partly different. One aspect is the agricultural setting and another is the value of the end product. For instance, dried mushrooms are highly valuable on the EU market, especially when organic. For instance a kilogram of yellow boletus is traded at the European organic market with some 100€ per kilogram. In comparison dried organic plum or apple costs in Europe some 20€ to 25€ per kilogram. It is remarkable, that such valuable goods are worth

producing and even seem to pay for the expensive analytic testing for the European organic market (see below in conclusion 2).

However as shown in chapter 4, it is the farmer who has the largest influence on quality by fertilizing, choice of land with a given soil quality or the use of pesticide. In fact, many Kyrgyz products such as plums, apples don't even need much treatment and are therefore not at risk. It can be safely assumed, that a typical Kyrgyz farmer rather chooses to apply an insecticide to avoid losing the harvest. This would be fine as long as an herbicide like Naphthyl Acetic Acid is used at the appropriate time and concentration to postpone harvest and thereafter the plums or apples are tested. If a farmer has sufficient funds, he/she rather chooses to invest in increasing income, rather than increase costs to secure quality. Indeed, the already poor sense for quality that prevails in the Kyrgyz society is aggravated by attitudes like "our products being the best ones". This overconfident stance avoids a critical look at the growing business of input dealers that bring bizarrely promising Chinese agro-chemicals on the market to reach Kyrgyz farmers. This low incentive to look or invest into quality coincides with a hard to use quality infrastructure close to a farmer or processor in rural areas.

When looking at pomicultures, one argument has been raised in various interviews. Healthy forests are a precondition for diverse and good quality plums, apples, not only for organic products. Even more so mushrooms, walnuts and Sea-buckthorn require a healthy environment that Kyrgyz forests still provide. In fact, most Kyrgyz interviewees were proud of their forests and this circumstance could be utilized more. In any case, paying more attention to preserving the natural forest setting is the necessary condition for all Kyrgyz products being successful.

Finally, the degree of organization seems to play a role, similar to the third continuum of SLE's QI study in Ghana. It is of relevance for the utilization of various QI services by value chain actors. It can be concluded that the more organized, the more QI is utilized compared to fragmented value chains. Organizational structures in value chains can reduce entry barriers for QI utilization. NGO's work is remarkable, in structuring micro-FBOs to FBOs and FBOs to companies and companies to exporters. Nevertheless, since attitudes need time for changes, it is a decade-long effort.

QI utilization

In fact, this research found a yearly utilization of some 1000 tests with the biggest QISP KyrgyzStandard. This level of QI utilization is poor given the third of the Kyrgyz population earning their income in the Agriculture Sector. This would amount to a number of family units producing foods amounting to the 5^{th} order. However, with the annual number of tests in the 3^{rd} order, it leads to a proportion of food being

tested at least once in the year only in the 2nd order. Hereby, it is assumed that this 1/100 of the population testing once in a year, corresponds to 1 percent of the foods being tested. Reflected on the QI utilization, instead of the 1000 annual tests 100.000 tests would be expected.

Centralized NQI

Besides this low level of QI use, and even in the central lab Bishkek, relatively simple tests can be done. The more rural a setting, and this is where agricultural products like plums, apples and tomatoes are grown, the less the QI service offered. The reason is the high operating costs of equipment such as HPLC, allowing for instance to purchase more efficiently reference materials. A further reason why to station such labs in central cities are the easier access to sufficiently qualified lab staff. However, such central set up renders the use of such lab service difficult for the QI users. The samples have to be taken far away from the lab, while sampling is crucial for a solid interpretation. The costs and the time needed for such sample transport is a significant obstacle for a farmer or processor. Either production gets only results that are a week old or production is interrupted.

Possible theoretical solution that was rejected after internal discussions:

To increase QI utilization, it could theoretically be made obligatory, by forcing all traders to conduct tests. However, this obligatory measure would need to be policed. Also against this suggestion is fact that generally it would cause costs. Health issues on the domestic market have not been observed. Voluntary measures are cheaper to introduce.

Advantage: New national standard could eliminate health risks, if they exist.
Disadvantage: doubtful that sustainability can be achieved against contrary habits.

Division of labor in QI

Further than the central QI setup, its utilization suffers also from confusing and ineffective structures. As chapter 4 shows, the scope of tests that can be made is sufficient for the domestic and EAEU market. However only for pesticides, 771 more active agents need to be tested for the EU market; this is over double the amount of chemicals that the EAEU market demands. In the policy strata two obstacles further dampen the QI utilization. There is an obvious overlap between the state inspectorate and the two technical ministries' labs. Partly, the same tests need to be performed twice. Further confusion stems from restructuring and areas of responsibility between the governmental QI providers. The national accreditation agency KCA has

lost its international recognition. As an effect since the ILAC status was lost, the 93 labs that were previously accredited, have lost their credibility too.

Also foreign development actors play a significant role in effectively raising quality standards and increase chances of successfully marketing Kyrgyz products. However, in order to be sustainable, the Kyrgyz authorities need to continue and take over. Efforts take decades, because they have to chance mindsets that have adapted to a Sowjet regime.

Vis-à-vis this plethora of issues, the question for this study is -where to begin-. Three aspects were leading the research team towards conclusions.

1. In rural Jalal-Abad Oblast, this research studied farmers, traders and processors for plum, apple and tomato. The analysis of these value chain participants and quality infrastructure and their interaction leads to the conclusion of poor market linkage and low cash availability. This is particularly valid among farmers and local traders, whereas processors possess sufficient cash for investments, such as QI utilization. Regional traders, exporters, importers or processors have a higher chance to invest in transport, processing with sufficient profit margin. Together with GIZ's focus on small scale entrepreneurs, this is why the research focused on small processing companies for apple juice, dried plums and tomato paste for example.
2. Change requires time. Therefore a didactic sequence and growth is needed. Real change can only partly be reached through obligation, but be achieved more sustainably with voluntary motivation. Positive examples support can motivate. Therefore the EAEU customs union is the first positive opportunity. Quality requirements of the EAEU market aren't so much above the already produced Kyrgyz plums, apples and tomatoes. Kyrgyz NQI already successfully issues export certificates for exports to Russia and other EAEU markets. However, for the most part, these markets don't leave much margin of profit for the Kyrgyz producers and processors. QI does only suffice the capacity for the EAEU market barely, but a huge market remains untapped. The European market is more demanding in terms of transparently demonstrating quality. Especially the organic market is growing and attracts with much higher prices. For example St John's Wort costs per kilogram 2€ whereas in the EU it is offered for 150€. More QI use would be necessary to sell Kyrgyz products on the organic market, but is also beneficial to refinance the operating QI costs.
3. The volatility of demand and price on the market hinders farmers and processors alike to invest in quality and quality infrastructure services. It is the unpredictability that hinders company managers to allow investing in quality.

Would a farmer or processor more reliably be in position to sell to a given price, the readiness grows to take smaller risks and invest in quality. In a functional value chain, this condition is fulfilled. Therefore, in order to increase steadiness of demand, price and quality, formal and binding agreements are necessary. Customers with high demand, multiple suppliers and a reputation to defend tend to make such formal agreements. Such formal or contractual links between customers and suppliers render quality easier to manage because communication has one uniform term for quality along the value chain.

7 Recommendations

The goal of the assignment was providing recommendations on how food safety and quality infrastructure services can be improved along selected value chains with the goal to create jobs and generate income. The recommendations are meant to contribute to increases in export revenue, systematic improvements in risk management for food safety and quality, and new jobs. Putting these indicators into a logical cause and effect relationship, it becomes apparent that food-safety management systems need to be implemented in order to access export markets. Increased export revenues lead to further investment and job creation.

Based on the findings, it became apparent that economic incentives and market forces are possible efficient drivers for change within SME management. While many micro, small and medium food processors continue to supply informal markets neglecting conventional food safety management standards, others linked to formal markets have been undergoing change in order to meet their buyers' requirements. This occurs despite the fact that all companies are mandated by law to implement FSMS. However, only where customers value food safety based on sophisticated certification and auditing processes, implementation occurs. In addition, simplified certification procedures, internationally accredited Kyrgyz laboratories covering all necessary tests and better coordination of national food safety policies will decrease costs for SMEs smoothing the transition to sophisticated procedures guaranteeing food safety.

This leads to three intervention areas in order to reach the aforementioned results. First, Kyrgyz SMEs need to be linked to formalized markets and supported in their efforts to comply with their customers' requirements. Second, QI service capacity and quality needs to be strengthened and aligned with the needs of Kyrgyzstan's exporting fruit and vegetable processors. Third, the general framework conditions need to create a conducive environment fostering innovation, investment and growth.

7.1 Integrate Kyrgyz SMEs into international food supply chains

Based on a needs analysis, Kyrgyz SMEs require market intelligence, business networks, marketing skills and modern processing means in order to link them to international food supply chains. Successful integration, however, demands compli-

ance with food safety requirements, which is necessarily based upon knowledge and attitude of SME-management. Therefore, a set of activities is recommended which will incorporate market linkage measures into existing activities and will render GIZ's current efforts to facilitate HACCP-implementation more effective.

R1.1. Extend existing CCI export promotion platform by market linkages component

The Chamber of Commerce and Industry, particularly its Southern branch, appears well suited to offer support services and market intelligence to its members. On the one hand, it is already a partner of GIZ and on the other hand, it is the platform for Kyrgyz companies. However, the recently established export promotion platform appears to focus, so far, mostly on compliance facilitation. Contributions to trade fair participation is planned but has not happened so far. Apart from trade fair participation, CCI South should conduct market surveys for potential target markets, function as a one-stop contact desk for foreign retailers and offer marketing-related skill trainings including language courses, negotiation training and customer relationship seminars. Offered trainings should be implemented in a demand-oriented manner. Where CCI does not perform sufficiently, provide support and complement with additional partners.

R1.2. increase knowledge on required export certificates among food processors

Many food processors have heard of export certificates, but they are rarely familiar with the procedures and requirements. This hinders their compliance. Hence, it is necessary to compile the information and disseminate it via appropriate communication channels. Information has to include a list of necessary certificates and issuing institutions with their location and prices. This list should be spread to all advisory services and business associations interested in building-up their consulting capacity.

R1.3. Improve HACCP implementation facilitation

Current HACCP implementation rates are low. This is linked to a significant knowledge gap at company level on specific food hazards but also to a lack of intrinsic motivation to invest into HACCP implementation. Hence, it is necessary to operationalize HACCP guidebooks for different food sectors and companies of different scales. This facilitates the work of local HACCP consultants and multiplies their reach. Among food processors additionally, awareness needs to be raised about the benefits of food safety management systems in comparison to end-of-the-line product test to increase motivation through a on-the-job-training.

R1.4. Consider negotiating an extension of the transition period before the entry into force date of Kyrgyz producers complying fully with EAEU's import restrictions, while boosting processor's preparedness for the common market.

The EAEU customs' union regime will enter into force in August 2017, just nine months ahead. Even with all efforts being put on HACCP and other quality trainings in Food Safety Management Systems, many existing suppliers of Kyrgyz products into EAEU countries might not be able to continue delivering products to the EAEU. Another reason is the circumstance that many EAEU funds have not been disbursed or implemented. This postponement would needs to be negotiated by the Kyrgyz government, but is worth considering and worth bringing up by GIZ Kyrgyzstan. It would avoid the risk of rejections and grant more time for EAEU market compliance preparation through the measures described in the Recommendation 1.1. to 1.3.

7.2 Increased QI Utilization through service capacity and quality

R2.1. Widen scope of number of parameters measured by Kyrgyz NQI

Even admitted by QISP themselves, Kyrgyz labs can only measure some 4 out of 5 parameters for the EAEU, let alone the EU. This is even more relevant in rural production areas. This circumstance does not prevent QISP to issue Export certificates nevertheless. This leads to risky international trade behavior that might lead to trade barriers. A necessary condition for the Kyrgyz NQI to detect such pesticides, heavy metals and other contaminants, it needs to widen the scope. An efficient and effective distribution of labs needs to be coordinated, best by KCA. Besides GIZ or PTB, flanking partners could be UNIDO. During transition periods, PTB could assist with regional inputs, where Kyrgyz products are tested in neighboring countries, when logistically useful.

R2.2. Stronger coordination supervision would lead to effective early warning systems, prevention of rejections and organization of recalls; Supervising body could facilitate national horizontal policy formulation;

At present, the Kyrgyz National Quality Infrastructure is managed by the State inspectorate (PM), the three line ministries for Economy, Agriculture and Health, and assisted by development agencies such as GIZ, PTB or UNIDO. A consolidated effort by relevant institutions could contribute to streamlining processes and their stakeholders. In order to reach for this goal, a discussion needs to be initiated and managed by the strongest and most competent Kyrgyz institution.

R2.3. Strengthen Phyto-Sanitary Services by operating on village level with licensed and honorary phyto-sanitary inspectors

Already, the state inspectorate engages Para Vets are already by to conduct veterinary inspections, after trainings and a government controlled licensing procedure. However, as effective as these Para Vets are placed in rural areas, the Phyto-Sanitary part is only a fifth as strong. So the idea is to transfer the encouraging lessons learnt to the Phyto Sanitary Sector. Such a measure would not only create jobs in rural areas, but also boost the quality of Kyrgyz products. In order to pilot cost effectively, some value chains could be tried out with limited resources in rural Jalal Abad.

R2.4. Increase customer orientation of QI services

While there were direct accusations or complains, inherently interviews revealed some unhappiness about the QI providers attitude towards customer and the involved friendliness. Rather than "educating" unknowing farmers, the idea of helpful services, would attract more QI customers. This would require some change in the organizational cultures of the QISPs.

R2.5. Decentralize towards the production hubs, as close to the beginning of the value chain.

Interviews revealed that QI services performed by governmental services were actually more a burden than an asset for entrepreneurs. QI services lack attraction to those who have the highest influence on quality, the farmers. Since they are offered distant from where farmers grow, and given the efforts to transport samples and retrieve results, they are perhaps only used by processors if at all. However, by registering the place of origin, QI services could detect where production hubs are and selectively build up services offered in these hubs. Should private QISP be engaged, consider proposing incentives, such as tax breaks.

R2.6. Apple-, Plum and Tomato seedling material should be certified.

In order to achieve the highest possible quality sustainably, while creating jobs in rural areas, certified seedling material is required. Good seedlings and tree seedlings require amounts of manual labour, are easy to spoil and farmers risk purchasing the wrong material with the little funds they can invest. By certifying the seedlings, the government would improve the quality of the plants and agri-products, but also create a job opportunity in rural areas.

7.3 Create a conducive environment for economic growth and jobs

R3.1. Built up capacity to conduct more on-the-job HACCP trainings

Currently only four HACCP trainers operate in Kyrgyzstan. The research team clearly concludes this is too little in number for preparing Kyrgyz processors in time before 2017 for the customs unions' start date of trade barrier enforcement. The idea would be conducting Training of Trainers (ToT) in order to prepare 40 HACCP consultants. There would be an opportunity to create jobs for youth by facilitating the training on-the-job for interested young professionals and entrepreneurs. The mere increase of training capacity would be insufficient and should be flanked by a rewrite of the curriculum. A more on-the-job nature of the training allows the participants to learn concrete steps effectively. By implementing the concrete improvements in the production, showcases could be created for other SME to replicate. The government would have the opportunity to contribute and increase effectiveness by flanking this with a financial support program for the showcases, through cheaper loans.

R3.2. Ease access to financial means

Quality improvement and effective Food Safety Management requires investments, which in the field were rarely observed. The lack of financial investments in processing comes due to hesitance to acquire loans, which are expensive. The government, assisted by development actors such as KFW could introduce and facilitate specific financial instruments aiming at higher quality and / or at more export of Kyrgyz products. This would require supporting business plan development at processor level, since banks often miss sufficient quality in proposals. GIZ has the opportunity to advocate for and support this process with its technical expertise and in country network.

R3.3. Strengthen reputation of products from the Kyrgyz South

Traceability is a necessary condition for good labeling and effective demonstration of quality. To introduce this is not to demanding if the Kyrgyz national pride for their walnut, apricots and apple forests is utilized. Already now, certificates of origins are issued. More strictly applying relevant regimes, more prominently advertising for quality in connection with supporting QI and quality policies, does open up possibilities for Kyrgyz suppliers in the EAEU or potentially EU.

R3.4. Strengthen comprehensively organic products and the confidence in them, with all the entailed QI services

The more products and quantities are organic, the higher the QI utilization and the more QI services become affordable. Nevertheless, organic products have a high potential, as chapters 4.1, 4.3 and 5.5 have demonstrated. The higher the value of products, the higher the chance that quality plays a role. Processors have little influence over quality, as it is required in organic products, but farmers do, while they lack the finance. Most Farmers produce organic by default, such as Apple, Plums, Apricots, Walnuts, Buckthorn, medical herbs and many more. However, since investments need long-term thinking, many farmers become doubtful that this will return investments. Hence, farmers are observed dropping out of cooperatives in significant proportions. While admittedly a part of the dropouts are due to lack of diligence, many drop out willingly and consciously lacking the confidence to comply, while the potential exists. In order to increase farmer's confidence in organic products, intensive community mobilization is required, as a necessary condition for market linkage.

R3.5. Strengthen Kyrgyz forests' reputation and foster environment for organic products

Demand for forest products is high and the market potential for Kyrgyz suppliers too. However, GIZ's experiences with organic products like valerian, melissa, mint thyme, and sea-buckthorn show that they need an intact forest environment. Also other agencies experienced similarly with growing and producing dried medical herbs, mushroom and walnut. On the other hand, the threat is for these organic environments are the overexploitation or even depletion of the state managed forests. In order to secure this condition, necessary firstly for quality Kyrgyz products, an information campaign would be required.

R3.6. Finance and take over development cooperation's efforts

Kyrgyz NGOs have been financed by external donors, development aid institutions and NGOs. Kyrgyz product marketing has been and is still benefiting from such support, not only on the lucrative export market. Such efforts have been continuously been performed during decades, since the countries farmers' mindset has to be changed and confidence built. This was done successfully, but to render these interventions sustainable, the Kyrgyz authorities should invest more, get increasingly involved and harvest the benefit under their national name. While this might be an uphill struggle, the Kyrgyz authorities are motivated to stand well reputed in the EAEU but also internationally, therefore probably ready to invest.

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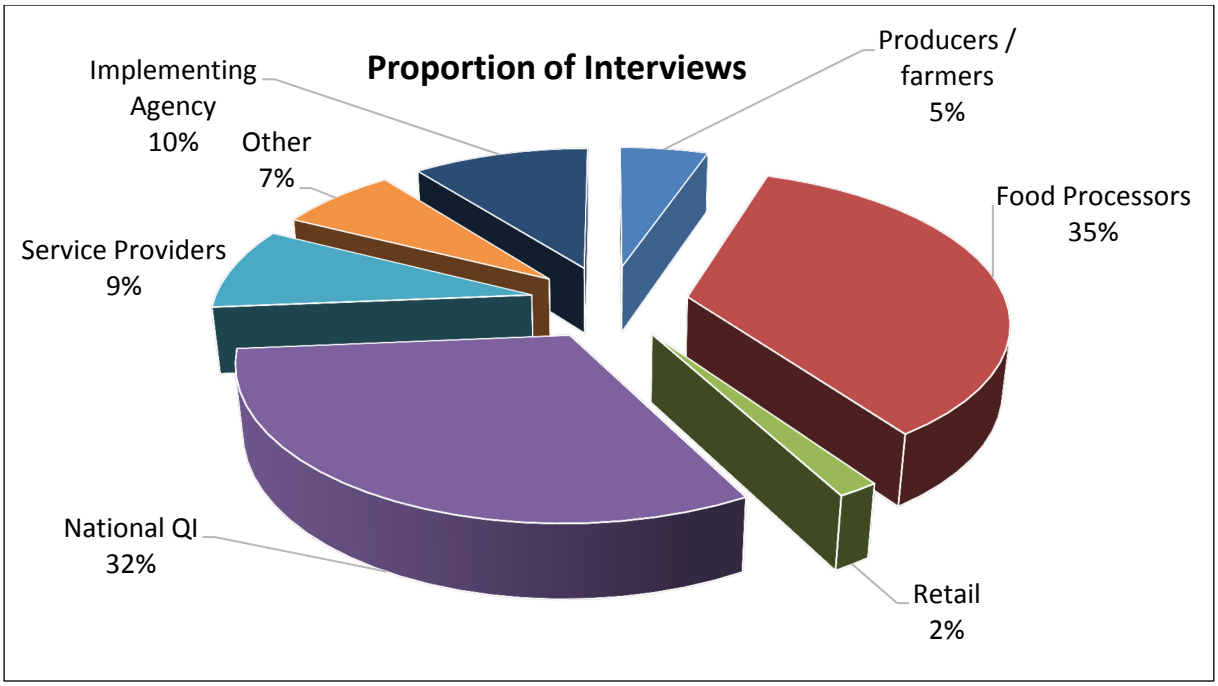
Annexes

Annex 1: Interview reference list

Overview	
Producers / farmers	3
Food Processors	20
Retail	1
National QI	18
Service Providers	5
Other	4
Implementing Agency	6
	57



Code	Date	Category	Name
BSK001	28.06.2016	National QI	Aigul Aksupova
BSK003	29.06.2016	Service provider	Sania Koptseva
BSK004	29.06.2016	National QI	Ermek Kurmanbaev
BSK005	29.06.2016	Food processor	Maksim Metel
BSK006	29.06.2016	National QI	Aigul Dzumakanova
BSK007	29.06.2016	National QI	Nina Aleksandrova Mukhamedschina
BSK008	29.06.2016	Implementing Agency	Christiane Oermann
BSK009	30.06.2016	Food processor	Iurii Sosnovskii
BSK010	30.06.2016	National QI	Vladimir Pak
BSK011	30.06.2016	Service provider	Turgunbaev Kubanychbek
BSK012	30.06.2016	Implementing Agency	Denis Krasnozhonov
BSK013	01.07.2016	Implementing Agency	Asanaliev Salmorbek
BSK014	01.07.2016	National QI	Dr. Kalysbek Jumakanov
BSK015	01.07.2016	National QI	Bakyt Shabdanov
BSK016	01.07.2016	Retail	Chynara
JAL017	04.07.2016	Implementing Agency	
JAL018	04.07.2016	National QI	Dr. Toktomamat Burnjev
JAL019	06.07.2016	Food processor	
JAL020	06.07.2016	Farmer	Muradin
JAL021	06.07.2016	Farmer	Ms.
JAL022	06.07.2016	Farmer	Manas
JAL023	06.07.2016	Service provider	Mr. Orozbek Ergeshov
JAL024	07.07.2016	Other	Dastan Ulukbek Ulu
JAL025	07.07.2016	Food processor	Mr. Abdygapar
JAL026	07.07.2016	Service provider	Zhoibolotov Syrgabek
JAL027	08.07.2016	National QI	Rustan Abdykulov
JAL028	08.07.2016	National QI	
JAL029	08.07.2016	National QI	Sulja Hodji-Martova
JAL030	08.07.2016	Food processor	
JAL031	08.07.2016	Food processor	Kannazarov Nurbek
JAL032	08.07.2016	Other	Michael Müller

Code	Date	Category	Name
JAL033	11.07.2016	Service provider	Gulzada Kudaiberdieva
JAL034	11.07.2016	Food processor	
JAL035	11.07.2016	Food processor	Janybeg Doldeev acting director
JAL036	11.07.2016	Food processor	Alisher Uraimov
JAL037	12.07.2016	Implementing Agency	Anara Sartmanbetova
JAL038	12.07.2016	National QI	Mr Ahmat
JAL039	12.07.2016	Food processor	
JAL040	12.07.2016	Food processor	Elda Jon
JAL041	12.07.2016	Food processor	Nasiba
JAL042	12.07.2016	Food processor	
JAL043	13.07.2016	National QI	Torobay Dobolbekov
JAL044	13.07.2016	Food processor	
JAL045	13.07.2016	Food processor	
JAL046	13.07.2016	Food processor	
JAL047	14.07.2016	Other	Ermekov Bakytbek Zulamovic
JAL048	14.07.2016	Food processor	
JAL049	15.07.2016	Implementing Agency	
JAL050	15.07.2016	Food processor	Mustafa Dabir
OSH051	18.07.2016	National QI	Orunbei Junnusbayovic
OSH052	18.07.2016	National QI	
OSH053	19.07.2016	National QI	
OSH054	19.07.2016	National QI	Dr. Ernisbek Kanysbekovic
OSH055	19.07.2016	National QI	Dr. Kubanik Saparov
OSH056	19.07.2016	Food Processor	
BSH057	25.07.2016	Other	Ms. Dilara Alimjanova
BSH058	25.07.2016	National QI	Mrs. Kozlova
BSH059	25.07.2016	Food Processor	Mrs. Ismailova Gulmira
BSH060	02.08.2016	Implementing Agency	Elvira Baijumanova

Annex 2: Interview guideline producers

PRODUCER: Guideline-based Interview

Production & Marketing (Practice)

- Please tell us about your farming practices.
- What are the usual procedures?

→ Do you apply fertilizer? Why not?
→ Do you use pesticides? Why not?

- Processing:

→ What is your final product?

- Marketing:

→ Who do you sell to?
→ Where are they located?
→ Do they have any requirements on your product?
→ Would you like to change something about your selling practices? [aspiration]

Knowledge, Attitude

- Have you had any complications selling your product?
- Have your buyers asked you changed something in your production processes?
- Would you change something if the buyer demands it? What would he have to offer?

Support services

- Do you attend trainings or get advice on your production techniques?
- Who provided it? Who paid for it?
- What did you think of the service? Was it helpful?

Socio-Demographics

- Age
- Gender
- Member of a farmer's association

Annex 3: Interview guideline for processors

PROCESSOR: Guideline-based Interview

History

- Please tell us about the history of your company.

→ When did operations start?
→ What are you current activities? [categorization as success case or not]
→ What have been recent developments and changes?

Sourcing, Processing & Marketing (Practice)

- Please tell us about your business activities.
- Raw materials:

→ How do you get your raw materials?
→ Do you always buy from the same people?
→ Do you know where your raw material is coming from [traceability]?
→ What do you look for in raw material? Do you have any requirements?

- Processing:

→ What is your final product?
→ What is the state of your processing facility? [investment needs]

- Marketing:

→ Who do you sell to?
→ Where are they located?
→ Do they have any requirements on your product?
→ Would you like to change something about your selling practices? [aspiration]

Knowledge, Attitude

- Have you heard of companies selling to Kazakhstan or other international markets? Do you know how they did it? [intercompany cooperation]

→ What would you need to send your products to Kazakhstan? [knowledge of certification, etc.]

- Where do you inform yourself on food safety issues? [information channels]

- What are your plans for the next five years?[attitude towards investment]

  → Which changes would you like to make to your final product? [business mind-set, attitude towards investment]

Food safety management (Practice)

- Do you conduct any quality checks? Do you send samples to a laboratory?

→ To which one? Where? How much does it costs? How long does it take to get results?
→ What is your opinion on the service? Are you satisfied?
→ Have you rejected raw material based on its quality? Do you document such cases?

Support services

- Over the past five years, have you relied on consultants, advisory services or development project interventions to get information and advise on business decisions?

→ Who provided it? Who paid for it?
→ What did you think of the service? Was it helpful?

Capacity

- Which problems could occur with your product or the raw material?

→ Where in the process could quality be challenged?

- Do you keep documents of each transactions?

Stats

- How many people are currently employed?

→ How many <25? How many male/female?

- What is the total annual volume of your production?
- Investitionspotential

Annex 4: Health risks per food category and value chain

Health risks per food cat. / value chain	Categorization of foods			
Value chain	**Products dried**	**Products canned**	**Products juiced**	**Product raw**
Apple	dried apple for compot and teas; infestation hydrocyanic acid Piperonylbutoxid, Organozinn	Apples could be sold as apple sauce like in Europe, but no such products were observed	Applejuice	Raw apple for regional markets and Bishkek
Plum	Dried plum; infestation hydrocyanic acid Piperonylbutoxid Organozinn	pureed plum jam, are sold in large quantities Europe wide		Raw plum for regional markets and Bishkek
Apricots	infestation hydrocyanic acid		This product wasn't observed in KG	Raw apricots for regional markets and Bishkek
Cherry	Cherries are dried in Europe, but no dried cherry was observed in Kyrgyzstan	cherry jam, is widely used in Europe	Cherry juice wasn't observed in KG but the EU market islarge	Raw apricots for regional markets and Tajikistan
Walnut	Dried in order to extend shelf life.	Walnuts pressed for oil, and listed here		Raw whole walnut for regional markets and Turkey
Pistachio	Dried in order to extend shelf life.	Pinocchio is seldomly pressed		Raw pistachios for regional markets and TR
Tomatoes	Not dried yet in Kyrgyzstan dried tomatoes being widely consumed in Europe. Nitrate (NO_3)	Tomato paste is sold in jars and tubes. Nitrate	While tomato juice is valuable for the EU market, no such product obsrvd. in KG, NO_3	Nitrate easily mechanically damaged
Medical Herbs	Most medical herbs that are sold as tea herbs such as chamomile, St John's word, and valeriana need to be dried.		Not relevant	Not relevant
Mushrooms	For soups, dried mushrooms are utilized and even exported to France from one of Heavy metals		Not relevant	Not relevant
Health risks	microtoxine (aflatoxin, etc.) and bacteriological contamination	Content based health risks such as residues	If not pasteurized, bacteriological contamination, content based health risks (residues)	Bacteriological contamination
QI services necessary to determine conformity.	Toxicological laboratory, bio-lab also mobile	HPLC	HPLC, bio-lab also mobile	bio-lab also mobile

Annex 5: QI service providers' mapping

Org.	Location	Relevant Laboratories	Services Offered (examples)	Price per Service/ sample (in GHS)	Laboratory Accreditation?
CSM	Capital Bishkek 9 Oblasts (regions)	Pesticide residue; Microbiology ; heavy metals and Metallic contamination; Mycotoxins laboratory Chlororganics	Microtoxology: Aflatoxin (B1, B2, G1, G2); Ochratoxin; Fumonisin Microbiology: e. coli, staphylococcus and Salmonella Pesticides: Pesticides registered with EPA, chemicals (e.g. DDT, organochlorins)	Pesticide per fruit type and sample KGS179: Microtoxines:KGS722 Chlororganics: KGS946 Heavy metal: KGS697 (per element)	Yes Once KCA is accredited with ILAC again
MOFA labs.	Capital Bishkek 9 Oblasts or Regions	Visual Inspection; basic chemical analysis	Basic laboratory and phytosanitary services; Phytosanitary Certificate	price / certificate: 490 KGS	No
State Inspectorate on Veterinary and Phytosanitary Security	Capital Bishkek 9 Oblasts Regions	Phytosanitary inspection			
Org.	Location	Relevant Laboratories	Services Offered (examples)	Price per Service / sample (in GHS)	Laboratory Accreditation?
MOH	Capital Bishkek and all 9 Oblasts / Regions	2 main in Bishkek and Osh, 7 sophisticated in oblasts and 40 basic diagnostic labs in the rayons	Processed products Only 80 to 85 percent of required results (for fruit and vegetable certification) can be done at the national lab	90-200 SOM per parameter	Labs are not accredited.
Yntimak, QISP	Jalal-Abad	Nitrate (NO_3) and Veterinary Inspection	Nitrate	150KGsom/test	Accredited

Annex 6: Detailed comparison of quality requirements by EU28 and EAEU

In this annex, the gap between the Kyrgyz domestic QI framework, capacity, quality, and the international standards shall be analyzed. Based on the top 10 export markets for Kyrgyz products two export markets are compared.

- EAEU (Armenia, Belarus, Kazakhstan, Kyrgyzstan and Russia)
- EU (28 memberstates

The European Commission has issued the "Marketing standards" according to EU Regulation 1221/2008. In 2011, the European Commission updated / modified the marketing standards through EU Regulation 543/2011 and excluded plums from the specific ones. On the remaining list of 10 specific marketing standards, apples and tomatoes still appear. According to the 2011 regulation, every EU country has to manage a list of traders, who are permitted to import from non-EU countries. This is compatible with the 50 UNECE specific marketing standards.

Pesticides are one of the most interesting indicators because of their residues' health risks, which is why they are going to be used here.

A look at the EU Pesticide Database on 15 September 2016 shows the most up to date data of approved pesticides. The database has entries for 1344 active agents out of which 483 are approved. Over two thirds, or 802 of the pesticides active agents are not approved. 20 pesticides' active agents are even banned and 39 are under inspection. Therefore, corresponding NQI have to determine whether the chemical is present or not. For those "not approved" no presence is allowed, but needs to be verified.

For the approved pesticides, maximum residual levels are formulated for 345 agents out of the 483. In these 345 active agents, quantitative measurements are needed for conformity checks.

The European import regulation, for example, has determined 345 maximum residue levels (MRL) that limit the level of pesticides in foods. The MRL depend on the food type and food / value chain, as for example the EAEU regulation permits for Diphenylamine 10mg/kg and in apple juice 0,5mg/kg. The lower threshold in juice can be explained with the denser or higher concentrations enriching during the juice processing.

Taking that as a concrete example, the difference for the Kyrgyz NQI becomes clearer. Diphenylamine is permitted in the EAEU with 10mg/kg. However, in the Eu-

ropean Union EU Diphenylamine is not permitted at all. Another example Captan shall be taken, which functions as a fungicide. Until 2004, Captan was classified as cancerogenic, but was reclassified after it was found not to cause cancer until excessive intake. In the EU, the acceptable daily intakes (ADIs) amounts to 0.1 mg/kg bw/day. In the EAEU, the maximum concentration shall not exceed 0.01 mg/kg in a kilogram of apple juice. A third example shall be taken with Methoxyfenozide an insecticide used against the codling moth, which infests apples in their larvae stage. For that the EU allows a 0.1 mg/kg day daily intake. In Germany, the insecticide will not be allowed after 2017. In the EAEU, even 7.0 mg/kg of fruit is allowed which leads to 1kg of apple that a person can eat reaching the healthy threshold.

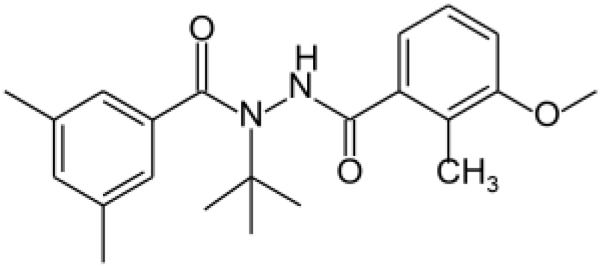


Image 21: Methoxyfenozide

Source: http://fuangagrochemical.en.made-in-china.com/

For the Kyrgyz certification it means not to perform different tests for the same products. However, the EAEU list of pesticides is 573 active agents long, in comparison to the EU's list of 1344 active agents.

Conclusions

- Since all interviewees stated the sufficiency of the Kyrgyz NQI for exports into the EAEU, the study concludes that continuation preserves already existing jobs.
- However, having conformity with EAEU regulations, Kyrgyz NQI is not far from in position to check conformity for exports into the EU.
- Furthermore, given the 573 pesticides that would need to be checked for exports into EAEU, the list of 1344 pesticides is more than double as long. The Kyrgyz NQI does not have the means to check conformity for imports into the 28 European countries (EU28)

Annex 7: AFVE member registry

	Company Name	Location	Product group
1	Landwirt. Kooperation Agroplast	Batken	Tomatenmark, Konservierte Gurken, Kompot, Säfte, Marmelade
2	Moltushum TSK	Batken	Abrikosen frisch, getrocknet, Reis, Bohnen, Zwiebel
3	AgroInformAsia GmbH	Bishkek	Consulting
4	Ches GmbH	Bishkek	Saft
5	Ecoprodukt Asia GmbH	Bishkek	Säfte
6	Erfrut GmbH	Bishkek	Säfte, Marmelade, Kompot, Konservierte- und purrierte Gemüse
7	Handelshaus Vkus Solnza	Bishkek	Brand
8	Kompaniya SEM GmbH	Blshkek	Ketchup, Senft, Essig, Limonade, Minerallwasser, Majonnaise
9	Kulikovsky Tort GmbH, Handelshaus Semeinye tradizii	Bishkek	Marmelade
10	Landwirt. Betrieb Kirbi	Bishkek	Kartoffelchips
11	Osko GmbH	Bishkek	Getrocknete Früchte
12	Pamir GmbH	Bishkek	Ketchup, Säfte, Kompot, Konservierte Bohnen
13	PU Raduga	Bishkek	Säfte, Konservierte Gemüse, Purierte Apfel
14	Ramax GmbH	Bishkek	Konservierte Mais, Bohnen, Tomatenmark,, Ketchup
15	Sokoev GmbH	Bishkek	Tomatenmark
16	Ailana GmbH	Chui	Tomatenmark, Konservierte Gemüse
17	OA Desert	Chui	Konservierte Gemüse, Tomatensaft, Säfte
18	OA Golden Sun	Chui	Konservierte Gemüse, Tomatensaft, Säfte
19	OA Kaindy-Kant	Chui	Zucker
20	PU Panasenko	Chui	Konservierte Pilze und Gurken
21	Rich Stem GmbH	Chui	Tomatenmark, Konservierte Gurken
22	Tokmok Plodoovosh GmbH	Chui	Geleefrucht, Konservierte Salate und Gurken, Apfel-Mrm- , Saft
23	Arbet i Co GmbH	Dorf Arka	Weinrohstoff
24	Fair GmbH	I-Kul	Djems
25	Issik-Kul Bio Plodopitomnik GmbH	I-Kul	Fruchtbaüme
26	Landwirt. Kooperation Zoloto Issik-Kulya	I-Kul	Purierte Früchte, Djems
27	Offene Aktiengesellschaft Yntymak	I-Kul	Säfte
28	PA Koompromservice GmbH	I-Kul	Säfte, Djems, Fruchtfühle
29	A.N.Mas. TO GmbH	J-Abad	Tomatenmark
30	Lesnoi prosukt GmbH	J-Abad	Marmelade, Wallnus in Honig, Fruchte mit Zucker, Öl, Honig
31	PU Baimyrzaev	J-Abad	Getrocknete Früchte
32	PU Alimzhanov	Osh	Frish Apfel
33	Agroelita SPPK	Osh	Getrocknete Früchte und Gemüse, Gewürze, Apfelmehl
34	Geschlossene Aktiengesellschaft EUM	Osh	Apfelsaft, Konservierte Gurken, Säfte
35	OA Kelechek	Osh	Tomatenmark, Konservierte Gurken, Kompot, Säfte, Marmelade
36	PU Kudaibergenova	Osh	Walnussmarmelade, Konservierte Gurken, Kompot aus Pfirsischen
37	PU Rahmanberdiev Mamirjan	Osh	Konservierte Gemüse, Tomatensaft

Annex 8: Value chain actors

Cooperatives, FBOs and Lechoses

In Jalal-Abad fruit and vegetables are mostly produced or collected by individual peasant farms and households, only a minority of state and cooperative farms could be found. However, family bound organizations and FBOs are more common. The tendency to operate as a single actor is especially favored by young producers. Reasons are mistrust into cooperative structures and a perception of ineffectiveness as well as smaller profit margins per member. According to some of the interviewed farmers, cooperatives bring back memories to the collective farms during the soviet times, even some of the young farmers have never experienced it. The advantages of cooperatives, for instance of shared and affordable equipment like solar dryers, a knowledge sharing network and last but least advanced selling opportunities – e.g. through access to transport, are apparently not fully convincing.

The cooperative **Agro Organic** was founded in May 2015. 143 farmers are members. Agro Organic is responsible for all necessary processing steps, packaging, marketing and logistics of their member's yield. Fresh and dried products are ranging from various fruits (among others apples and plums) to mushrooms and medical herbs. Next to production sides in Jalal-Abad Oblast also Issyk-Kul Oblast is a center of activity. Especially the main import and exports transactions are taking place there. Due to expensive Uzbek border tariffs, export through Uzbekistan is avoided where possible. Exported goods are mostly delivered to Russia (36 tons of wild apples in 2016 so far). Another target country is Tajikistan (25 tons of wild apples in 2015).

BioFamer Agricultural Commodity Service Cooperative – is mainly active in the organic cotton sector. Additionally, they try every year to establish organic fruits and vegetables value chains in the cotton crop rotation, so far without any success. Reasons are foremost the lack of own processing facilities and problems in ensuring quality at the farmer level Further challenges are the lack of steady market outlet. However, they still work with tomato and are currently in the process of certifying it. By now, they are not involved in the apple or plum sector and neither planning to do so.

Aksi-Bio cooperative was founded in 2014. Currently, there are 19 families registered.The aim was to collectively dry, store and market produce, mainly plums. Currently they are facing organizational problems. Every member is selling and processing on his or her own. Other challenges are congruent to the processors: lack of certificates, market linkages and proper processing equipment and facilities.

Kyrgyz Tokoky Bailigy (KTB) consists of 214 farmers and was established in November 2014 in Susak and Bazar Korgon with the help of GIZ's partner AGROLEAD. The production management only is done by some 10 lead farmers. Kyrgyz Tokoky Bailigy produces Walnuts, dried apples, plums, berries, mushrooms and medical herbs. KTB is interesting for this study because of its successful and famous walnut export to an internationally operating company in the Netherlands. In doing so, KTB fulfils the EU food import standards successfully. The Dutch company even purchases the nuts for snacks and bars according to the fair-trade regime and so financed a roof for the school and a bridge. In 2014, KTB exported 20 tons of walnut and aims at increasing it to 100 tons in 2016. In return, the Dutch client performs HACCP trainings for the members of the cooperative. The cooperative have plans to further store and process fruits / vegetables and is working on exporting 500 tons of dried apples to a German client.

Lechoses are the Forest Administration subunits. Hence, it is a public institution. They are responsible for forest management. Their field of activity includes monitoring of tenants, forestation and the maintenance of check points to controls inputs and outputs. In addition, they provide storage capacity as well as selling points for apple collecting farmers to supply wholesaler, processor and Middlemen.

Producers

According to a recently published survey by AGROLEAD, forest users see increasing opportunities for collecting and selling wild apples and plums. Among walnuts, livestock and mushrooms, apples are perceived as the most important contribution for their livelihood (Agrolead 2016). However, despite the supply of wild fruits is stable enough to support a growing income share, large parts of fruits stay in the forest without being collected. Next to missing linkages to potential buyer only basic collection techniques are known. So far no specialized training for collectors has been conducted (Agrolead 2016).

Tomato farmer face sales problems. Only 30 percent can be sold via middlemen to other Oblasts. 60 to 70 percent stays within the producing Rayons. The lack of processing companies in the area leads to large postharvest losses linked to low demand.

Middlemen

Middlemen could not be interviewed. However, since middlemen play a crucial role in the majority of the transactions, they should not be neglected in any further intervention. Middlemen are involved in all parts of the value chain. They are purchasing at the farm gate to supply consumers, wholesalers and retailers at bazaars,

as well as processors within Jalal-Abad, neighboring Oblasts or even abroad. In addition, middlemen also buy processed products and distribute them to retailer, further product improvement or clients abroad. Producers often complained in interviews about middlemen. Their profit margin is about 50 percent of the farmers and their adding of value is not comprehensible to them. In the producers opinion, middlemen only facilitate transport abilities. Nevertheless, additional value is also gained through network and market linkages, as well as the ability to store products. Some processors prefer purchasing raw material rather from a few middlemen instead of a large amount of single operating farmers, due to easier management and communication of quantity and quality requirements as well as the matter of time-saving. Additionally, the involvement of middlemen makes the establishment of an efficient food safety and quality transmitting mechanism down to the farm level difficult. They rarely function as information-sharing mechanism. Rejection of products at the market will not lead to a backward feedback. Instead, the middlemen will look for other suppliers leaving primary producers in the dark about food safety and quality requirements.

Supporting actors

Apple, plum and tomato value chain actors are supported by various organizations.

UNIQUE forestry and land use GmbH is an international consulting firm that provides expert services and advice on forest management and sustainable land use. Unique is the management body of the GIZ biodiversity program and coordinates the work of its other partners, namely Lesik-Yuk, Agrolead and RAS-JA. They generally work on pastures, use of community forests, agriculture and value chain development.

The NGO **Lesik-Yug** is supporting on producer level. They are the implementing partner of Unique Forestry in GIZ's Biodiversity program, offering trainings, cooperation and consultancy services to farmers and FBOs with a special focus on tree crops. They also advise the forest authorities and forest-based agro-enterprises.

Another NGO **AGROLEAD** implements the value chain component of the GIZ biodiversity program. Among others, they support the value chain of dried apples, for instance through offering solar dryers to farmer groups with outstanding track record. The goal of the project is to diversify farm incomes away from livestock to ensure forest regeneration. Currently AGROLEAD is faced by the challenges to link their farmer groups to institutional buyers. They recently supplied LLC GEDIK with 500t of dried apples. GEDIK then delivered to Martin Bauer Group, which used the

dried apples as tea flavor. AGROLEAD conducted a baseline survey for UTZ certified to identify the potential for organic certification, which is also cited in this study.

RAS-JA, the **Rural Advisory Service** is an NGO established in 1999 and funded by the Swiss HELVETAS. After 2010, RAS privatized and has developed to a small company with 70 staff. A German CIM-expert is supporting RAS as a deputy director. They are involved in the development of vegetable value chains, such as tomato. However, it also advices farmers and processors of all common commodities, where to purchase what raw material. As such, it works as a trade feedback mechanism between processors and producers. Within a specific tomato project between 2009 and 2014, RAS-JA supported farmers to produce suitable variety for a Chinese-owned processing plant. RAS facilitated the link-up by bringing the farmer group leaders together with the processor. The Chinese processing company went bankrupt , but two new ones are being built for a different market. They are supposed to be operational by August.

BioService was founded in 2007 as BioCotton was split into two entities (BioService and BioFarmer). The focus of BioService are trainings to farmers and cooperatives as well as the facilitation of organic certification. Among others, their areas of intervention are plum and tomato value chains. Apples are not part of their activities and by now, BioService is also not interested to join this sector. All mentioned actors so far are financially funded by Helvetas, GIZ or AgroHorizon. Farmers are currently not able to pay for services.

The **Aga-Khan Foundation** is also active in Jalal-Abad with their EU-funded MSDSP program. The goal is to promote growth of small and medium enterprises. The project has a budget of 1 Mio € and runs until December 2017. Working through competitions, Aga-Khan identifies suitable beneficiaries for their small grant program supplying 3'000€ and 50'000€ per beneficiary like farmer groups, greenhouse, processors or women groups. Aga-Khan is in so far interesting as their areas of operation are the fruit value chain. They aim at improving income of women and young people and improve entrepreneurial skills among local people. Currently their area of activity focuses on the Rayons Aksy and Ala-Buka. Apple and plum processors are supported so far.

The regional **Chamber of Commerce and Industry** (CCI) in Jalal-Abad is active in Southern Kyrgyzstan and coordinates activities in Osh, Batken and Jalalabad Oblast. Their scope is to support local and regional entrepreneurs to improve Market intelligence and enlarge their business network. In November 2015 CCI established the Kyrgyz Export Center with the goal to support companies in der export activities by

helping them to showcase their products at international fairs (trainings on presentation) and implements training on food safety management (HACCP, ISO). So far, two trainings on HACCP have been implementing complemented by one roundtable and one seminar. However, the Kyrgyz Export Center activities have not been frequently conducted and institutionalized yet. The CCI South Department works closely together with GIZ. Among others it points out companies to the Import Promotion Desk (IPD). A start-up office will be implemented by CCI together with GIZ in the near future. Its goal is to support especially young entrepreneurs in their endeavor to open up new business. The CCI's activities are partially funded by CCI's own funds and supported by donor projects (UNDP, GIZ, Aga Khan, USAID). Currently CCI has 120 members. The annual membership fees are 5000 KGS for private enterprise, 10000 KGS for limited liability companies and 30000 KGS for large companies. According to experts and observations the CCI capacities regarding expertise, management and coordination of activities on regional level are low. Since the CCI is the prime contact point for regional entrepreneurs who are searching for business support, potential markets and specific trainings, this becomes a crucial point. In addition, it is currently difficult for potential Kyrgyz or foreign trade partners to build up contacts to regional processors and entrepreneurs. This is a task, which is very suitable for the field of activities and interest of CCI.

The **Association of Fruit and Vegetable Entrepreneurs** (AFVE) also plays a role in supporting processors. AFVE offers trainings on technical regulations of the EAEU and HACCP implementation as well as advisory workshops for marketing. In addition they try to enlarge the business network of their members through fairs, workshops and meetings with potential trade partners mainly of EAEU markets, especially Russia and Kazakhstan are focused. Therefore, AFVE also established a branch in Russia. Lobbying on policy level, e.g. for tax regulations also belongs to their scope of work. Since Jalal-Abad fruit and vegetable entrepreneurs are only represented in the AFVE by three members and the association has no regional offices, it is not astonishing that Jalal-Abad Oblast is not in the center of the their activities. Indeed most trainings take place in Bishkek, however specific thematic workshops can also be held at company's location. Activities are mostly financed by donors (UNDP, GIZ, Helvetas, Worldbank, ADB) and in a small amount by member fees, which is 200 USD or about 13,500 KGS per member. In future, AFVE could be an important regional partner for further interventions. On national level they are already an important implementing partner for GIZ NAWI program.

The **Association of Young Entrepreneurs (JIA)** is an internationally connected countrywide Kyrgyz NGO supporting young entrepreneurs by connecting their

members to international and national trading partners and client as well as promotion platforms, like GIZ NAWI. Recently JIA has supported Farmers Organic Garden to export dried apple, plums and walnuts to Turkey. The association also provides legal advice for young entrepreneurs. JIA, founded in 2013, has currently 90 members in Jalal-Abad. However, most members are rather farmers or craftsmen than fruit and vegetable producers or processors. Eight members are active in the agricultural sector, next to seven producers, one fruit and vegetable processor – Farmers Organic Garden. JIA is funded by their member fees, which adds per member to 500 KGS per month. Besides, the association is not externally financed. However, GIZ is supporting them with training and equipment. As service in return JIA identifies and recommends potential companies for GIZ NAWI program.

Annex 9: Seven HACCP principles

1. **Analyze hazards:** Identify any hazardous biological, chemical or physical property in raw materials and processing steps, and to assess their likeliness of occurrence and potential to render food unsafe for consumption
2. **Determine critical control points:** Follow a logical decision-making process to determine points, steps or procedures in a food manufacture process at which control can be applied and, as a result, a food safety hazard can be prevented, eliminated or reduced to an acceptable level
3. **Establish limits for critical control points:** Set maximum or minimum measurable values separating acceptability from unacceptability for a given hazard (temperature, time, humidity, pH value, etc.)
4. **Establish monitoring procedures for critical control points**: Implement a planned sequence of observations or measurements to assess whether a critical control point is under control and to produce an accurate record for future use and verification (very important)
5. **Establish corrective actions**: Train employees in charge of monitoring in performing appropriate corrective actions once set limits are exceeded
6. **Establish verification procedures**: Regularly verify compliance with HACCP plan, keep process monitoring instruments calibrated and have small samples of products tested and compared
7. **Establish a record system**: Maintain records of critical control points, establishments of limits, corrective actions, results of verification activities and HACCP plan (essential part of HACCP system)

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Karin Fiege, **Gesa Grundmann**, **Michael Hagedorn**, Monika Bayr, Dorothee Heidhues, Florian Landorff, Waltraud Novak, Michael Scholze: Zusammen bewerten – gemeinsam verändern. Instrumentarium zur Selbstevaluierung von Projekten in der Internationalen Zusammenarbeit (SEPIZ). Berlin, 2004 S214

Pascal Lopez, Ulrike Bergmann, Philippe Dresrüsse, Michael Hoppe, Alexander Fröde, Sandra Rotzinger: VIH/SIDA: Un nouveau défi pour la gestion des aires protégées à Madagascar - l'intégration des mesures contre le VIH/SIDA dans le travail du Parc National Ankarafantsika. Berlin, 2004 S213

Birgit Kundermann, Mamadou Diarrassouba, Diego Garrido, Dorothe Nett, Sabine Triemer de Cruzate, Andrea Ulbrich: Orientation vers les effets et contribution à la lutte contre la pauvreté du Programme d'Appui aux Collectivités Territoriales (PACT) au Mali. Berlin, 2004 S212

Christian Berg, Mirco Gaul, Romy Lehns, Astrid Meyer, Franziska Mohaupt, Miriam Schröder: Self-Assessing Good Practices and Scaling-up Strategies in Sustainable Agriculture – Guidelines for Facilitators. Berlin, 2004 S211

Seminar für Ländliche Entwicklung (Hrsg.), Entwicklungspolitische Diskussionstage. Dokumentation zur Veranstaltung vom 29. März bis 1. April 2004 in Berlin. Berlin, 2004 S210

Iris Paulus, Albert Ewodo Ekani, Jenni Heise, Véronique Hirner, Beate Kiefer, Claude Metou'ou, Ibrahim Peghouma, Sabine Schliephake: Réorientation des prestations de services en milieu rural – recommandations pour le choix et le suivi des organismes d'appui. Etude pilote au Cameroun. Berlin, 2003 S209

ISSN: 1433-4585 ISBN: 3-936602-79-4